
Business API Ecosystem Documentation

Release latest

Feb 10, 2021

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This project is part of [FIWARE](#) and has been made in collaboration with the [TM Forum](#).

The Business API Ecosystem is a joint component made up of the FIWARE Business Framework and a set of APIs (and its reference implementations) provided by the TMForum. This component allows the monetization of different kind of assets (both digital and physical) during the whole service life cycle, from offering creation to its charging, accounting and revenue settlement and sharing. The Business API Ecosystem exposes its complete functionality through TMForum standard APIs; concretely, it includes the catalog management, ordering management, inventory management, usage management, billing, customer, and party APIs.

The Business API Ecosystem is not a single software repository, but it is composed of different projects which work coordinately to provide the complete functionality.

In particular, the Business API Ecosystem is made of the following components:

- *Reference implementations of TM Forum APIs*: Reference implementation of the catalog management, ordering management, inventory management, usage management, billing, customer, and party APIs.
- *Business Ecosystem Charging Backend*: Is the component in charge of processing the different pricing models, the accounting information, and the revenue sharing reports. With this information, the Business Ecosystem Charging Backend is able to calculate amounts to be charged, charge customers, and pay sellers.
- *Business Ecosystem RSS*: Is in charge of distributing the revenues originated by the usage of a given service among the involved stakeholders. In particular, it focuses on distributing part of the revenue generated by a service between the Business API Ecosystem instance provider and the Service Provider(s) responsible for the service. With the term “service” we refer to both final applications and backend application services (typically exposed through an API). Note that, in the case of composite services, more than one service provider may have to receive a share of the revenues.
- *Business Ecosystem Logic Proxy*: Acts as the endpoint for accessing the Business API Ecosystem. On the one hand, it orchestrates the APIs validating user requests, including authentication, authorization, and the content of the request from a business logic point of view. On the other hand, it serves a web portal that can be used to interact with the system.

The current documentation covers the Business API Ecosystem version 7.8.0, corresponding to FIWARE release 7. Any feedback on this document is highly welcomed, including bugs, typos or things you think should be included but aren't. Please send them to the “Contact Person” email that appears in the [Catalogue page for this GEi](#). Or create an issue at [GitHub Issues](#)

Installation and Administration Guide The guide for maintainers that explains how to install it.

Docker Deployment Guide The guide for maintainers that explains how to use Docker for deploying it

Configuration Guide The guide for administrations which explains the different configuration options

User Guide The guide for users that explains how to use it.

Programmer Guide The guide for programmers that explains how to develop plugins

Plugins Guide The guide for admins that cover the available plugins

1.1 Installation and Administration Guide

This guide covers the installation of the Business API Ecosystem v7.8.0 from the sources available in GitHub, installing manually the software dependencies and using the existing scripts for setting up the system.

The current version of the software has been tested under Ubuntu 15.10, Ubuntu 16.04, Ubuntu 18.04, Debian 7, Debian 8, and CentOS 7. THESE ARE THEREFORE CONSIDERED AS THE SUPPORTED OPERATING SYSTEMS.

Note: The preferred mechanism for the deployment of the Business API Ecosystem is Docker as described in [Docker deployment guide](#)

1.1.1 Installation

Requirements

As described in the GErI overview, the Business API Ecosystem is not a single software, but a set of projects that work together for providing business capabilities. In this regard, this section contains the basic dependencies of the different components that made up the Business API Ecosystem.

Note: These dependencies are not mean to be installed manually in this step, as they will be installed throughout the documentation

TM Forum APIs and RSS requirements

- Java 8
- Glassfish 4.1
- MySQL 5.7

Charging Backend requirements

- Python 2.7
- MongoDB
- wkhtmltopdf

Logic Proxy requirements

- NodeJS 6.9.1+ (Including NPM)

Installing basic dependencies

Basic dependencies such as Java 8, Glassfish, MySQL, Python, etc. Can be installed using the package management tools provided by your operating system. However, in order to easy the installation process some scripts have been provided.

Warning: The installation script may override some of the packages already installed in the system. so if you have software with common dependencies you may want to manually resolve them.

Installing basic dependencies using the script

In order to automate the installation of the basic dependencies, the script *setup_env.sh* has been provided. This script, located in the root directory, installs all the needed packages for Ubuntu, Debian, and CentOS systems.

Additionally, this script creates a directory */opt/biz-ecosystem* where Glassfish 4.1 and Node 6.9.1 are downloaded, creates a */etc/default/rss* directory used later for properties files, and sets up the PATH environment in your *.bashrc* file.

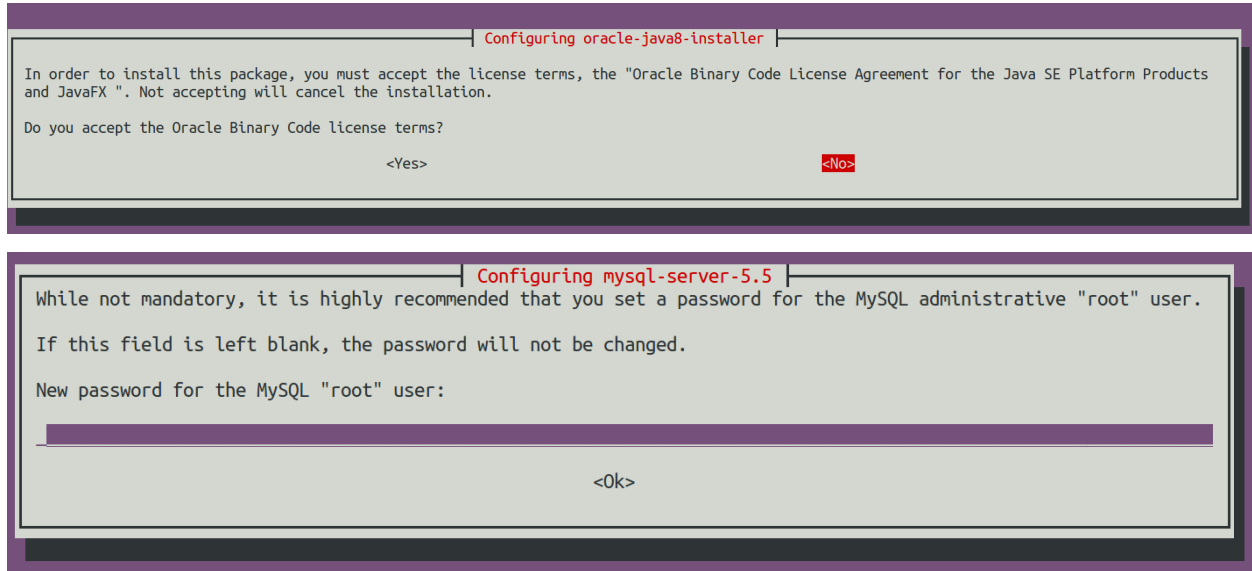
Note: The installation script changes the owner of all its created directories to your current user

To execute the script, run the following command from the root directory of the project

```
$ ./setup_env.sh
```

Note: Do not execute the script using sudo, for those tasks which require root privileges the script will prompt you to provide your sudo password

During the execution of the script you will be prompted some times in order to accept Oracle Java 8 terms and conditions and to provide MySQL root password.



Installing basic dependencies manually

Following, you can find how to install the basic dependencies without using the script. Be aware that some commands require to be executed as root.

APIs dependencies

Java 8 Debian/Ubuntu

To install Java 8 in a Debian or Ubuntu system, it is needed to include the *webupd8team* repository. In an Ubuntu system this can be done directly with the following command:

```
$ sudo add-apt-repository ppa:webupd8team/java
```

In the case you have a Debian system the following commands have to be executed

```
$ sudo echo "deb http://ppa.launchpad.net/webupd8team/java/ubuntu trusty main" | tee /
→etc/apt/sources.list.d/webupd8team-java.list
$ sudo echo "deb-src http://ppa.launchpad.net/webupd8team/java/ubuntu trusty main" |
→tee -a /etc/apt/sources.list.d/webupd8team-java.list
$ sudo apt-key adv --keyserver hkp://keyserver.ubuntu.com:80 --recv-keys EEA14886
```

Then Java 8 can be installed using the following commands:

```
$ sudo apt-get update
$ sudo apt-get install -y oracle-java8-installer
$ sudo apt-get install -y oracle-java8-set-default
```

Java 8 CentOS 7

For a CentOS 7 system, the installation of Java 8 requires downloading the package from the official site

```
$ wget --no-cookies --no-check-certificate --header "Cookie: gpw_e24=http%3A%2F%2Fwww.
→oracle.com%2F; oraclelicense=accept-securebackup-cookie" "http://download.oracle.
→com/otn-pub/java/jdk/8u102-b14/jdk-8u102-linux-x64.tar.gz"
$ tar xzf jdk-8u102-linux-x64.tar.gz
```

Then Java can be installed using *alternatives*

```
$ sudo alternatives --install /usr/bin/java java /opt/biz-ecosystem/jdk1.8.0_102/bin/
→java 2
$ sudo alternatives --config java

$ sudo alternatives --install /usr/bin/jar jar /opt/biz-ecosystem/jdk1.8.0_102/bin/
→jar 2
$ sudo alternatives --install /usr/bin/javac javac /opt/biz-ecosystem/jdk1.8.0_102/
→bin/javac 2
$ sudo alternatives --set jar /opt/biz-ecosystem/jdk1.8.0_102/bin/jar
$ sudo alternatives --set javac /opt/biz-ecosystem/jdk1.8.0_102/bin/javac
```

MySQL and Maven Debian/Ubuntu Once Java has been installed, the next step is installing MySQL and Maven

```
$ sudo apt-get install -y mysql-server mysql-client
$ sudo apt-get install -y maven
```

MySQL and Maven CentOS 7

For installing MySQL in CentOS, it is required to include the related repository before installing it

```
$ wget http://repo.mysql.com/mysql-community-release-el7-5.noarch.rpm
$ sudo rpm -ivh mysql-community-release-el7-5.noarch.rpm
$ sudo yum update

$ sudo yum install -y mysql-community-server
```

Then, for installing Maven

```
$ sudo wget http://repos.fedorapeople.org/repos/dchen/apache-maven/epel-apache-maven.
→repo -O /etc/yum.repos.d/epel-apache-maven.repo
$ sudo sed -i s/\\$releasever/6/g /etc/yum.repos.d/epel-apache-maven.repo
$ sudo yum install -y apache-maven
```

Glassfish The next step is downloading and extracting Glassfish

```
$ wget http://download.java.net/glassfish/4.1/release/glassfish-4.1.zip
$ unzip glassfish-4.1.zip
```

Finally, it is required to download the MySQL connector for Glassfish and include it within the Glassfish *lib* directory

```
$ wget http://dev.mysql.com/get/Downloads/Connector-J/mysql-connector-java-5.1.39.tar.
→gz

$ gunzip mysql-connector-java-5.1.39.tar.gz
$ tar -xvf mysql-connector-java-5.1.39.tar

$ cp mysql-connector-java-5.1.39/mysql-connector-java-5.1.39-bin.jar glassfish4/
→glassfish/lib
```

Charging Backend dependencies

Python 2.7 Debian/Ubuntu

To install Python 2.7 and Pip in a Debian/Ubuntu distribution, execute the following command

```
$ sudo apt-get install -y python python-pip
```

Python 2.7 CentOS

Python 2.7 is included by default in CentOS 7. To install Pip it is required to include EPEL repository. All this stuff can be done executing the following commands

```
$ sudo rpm -iUvh http://dl.fedoraproject.org/pub/epel/7/x86_64/e/epel-release-7-5.
↪noarch.rpm
$ sudo yum -y update
$ sudo yum install -y python-pip
```

MongoDB Debian/Ubuntu

To install MongoDB in a Debian/Ubuntu distribution, execute the following command

```
$ sudo apt-get install -y mongodb
```

MongoDB CentOS 7

To install MongoDB in CentOS it is needed to include its repository first. MongoDB can be installed executing the following commands

```
$ sudo echo "[mongodb]
name=MongoDB Repository
baseurl=http://downloads-distro.mongodb.org/repo/redhat/os/x86_64/
gpgcheck=0
enabled=1" > /etc/yum.repos.d/mongodb.repo

$ sudo yum install -y mongodb-org
```

Wkhtmltopdf Debian/Ubuntu

In Debian and Ubuntu Wkhtmltopdf is included in a package, so it can be directly installed with the following command

```
$ sudo apt-get install -y wkhtmltopdf
```

Wkhtmltopdf CentOS 7

In CentOS the Wkhtmltopdf RPM package has to be downloaded for installing it

```
$ wget http://download.gna.org/wkhtmltopdf/0.12/0.12.1/wkhtmltox-0.12.1_linux-centos7-
↪amd64.rpm
$ sudo rpm -ivh wkhtmltox-0.12.1_linux-centos7-amd64.rpm
```

Logic Proxy Dependencies

For installing Node and NPM it is needed to download the binaries from the official site and uncompress them

```
$ wget https://nodejs.org/dist/v6.9.1/node-v6.9.1-linux-x64.tar.xz
$ tar -xvf node-v6.9.1-linux-x64.tar.xz
```

Installing the Business API Ecosystem

As stated previously, the Business API Ecosystem is composed of different systems that need to be installed separately. In order to ease this process, it has been created an script **install.py** which can be used to automate the installation.

Installing the Business API Ecosystem using the script

The script *install.py* is located at the root of the Business API Ecosystem project. This script provides functionality to automate the installation of the software. Concretely, it downloads all the APIs and components, compiles and deploys the APIs, and installs python and node libraries.

This script depends on Python3 to work. If you have used the *setup_env.sh* script, Python 3 is already installed. Otherwise, you can install Python 3 using the following commands:

Debian/Ubuntu

```
$ sudo apt-get install -y python3
$ sudo apt-get install -y python3-pip
```

CentOS 7

```
$ sudo yum -y install scl-utils
$ sudo rpm -Uvh https://www.softwarecollections.org/en/scls/rhscl/python33/epel-7-x86_
→64/download/rhscl-python33-epel-7-x86_64.noarch.rpm
$ sudo yum -y install python33
```

Additionally, *install.py* specs the binaries of Glassfish and Node to be included in the PATH, and need to be accessible by the user using the script. This can be done with the following commands (Note that the commands are supposing both or them are installed at */opt/biz-ecosystem*)

```
$ export PATH=$PATH:/opt/biz-ecosystem/glassfish4/glassfish/bin
$ export PATH=$PATH:/opt/biz-ecosystem/node-6.9.1-linux-x64/bin

$ sudo chown -R <your_user>:<your_user> /opt/biz-ecosystem
```

If you have used *setup_env.sh**, the Glassfish installation directory already belongs to your user. In addition, the export PATH command has been included in your bashrc, so to have Node and Glassfish in the PATH execute the following command:

```
$ source ~/.bashrc
```

Moreover, *install.py* requires Glassfish, MySQL and MongoDB to be up and running.

Debian/Ubuntu

```
$ asadmin start-domain
$ sudo service mysql restart
$ sudo service mongodb restart
```

CentOS 7

```
$ asadmin start-domain
$ sudo systemctl start mysqld
$ sudo systemctl start mongod
```

Finally, during the deployment of the RSS API, the script saves the properties file in the default RSS properties directory. If you have used *setup_env.sh* this directory already exists. Otherwise, you have to manually create the

directory `/etc/default/rss`, being required to have root privileges to create it. Moreover, this directory must be accessible by the user executing the script. To do that

```
$ sudo mkdir /etc/default/rss
$ sudo chown <your_user>:<your_user> /etc/default/rss
```

The script `install.py` creates the different databases as well as the connection pools and resources. In this regard, after the execution of the script all the APIs will be already configured. You can specify the database settings by modifying the script and updating `DBUSER`, `DBPWD`, `DBHOST`, and `DBPORT`, which by default contains the following configuration.

```
DBUSER = "root"
DBPWD = "toor"
DBHOST = "localhost"
DBPORT = 3306
```

To make a complete installation of the Business API Ecosystem, execute the following command

```
$ ./install.py all
```

In addition to the `all` option, `install.py` also provides several options that allows to execute parts of the installation process, so you can have more control over it. Concretely, the script provides the following options:

- **clone**: Downloads from GitHub the different components of the Business API Ecosystem
- **persistence**: Builds persistence.xml files of the different APIs
- **maven**: Compiles the downloaded APIs using Maven
- **tables**: Creates the required databases in MySQL
- **pools**: Creates database pools in Glassfish
- **resources**: Creates database resources in Glassfish
- **redeploy**: Deploys APIs and RSS war files in Glassfish
- **charging**: Installs charging Python libs
- **proxy**: Installs proxy Node libs

Installing the Business API Ecosystem Manually

Installing TM Forum APIs

The different reference implementations of the TM Forum APIs used in the Business API Ecosystem are available in GitHub:

- [Catalog Management API](#)
- [Product Ordering Management API](#)
- [Product Inventory Management API](#)
- [Party Management API](#)
- [Customer Management API](#)
- [Billing Management API](#)
- [Usage Management API](#)

The installation for all of them is similar. The first step is cloning the repository and moving to the correct release

```
$ git clone https://github.com/FIWARE-TMForum/DSPRODUCTCATALOG2.git
$ cd DSPRODUCTCATALOG2
$ git checkout v7.6.0
```

Once the software has been downloaded, it is needed to create the connection to the database. To do that, the first step is editing the `src/main/resources/META-INF/persistence.xml` to have something similar to the following:

```
<?xml version="1.0" encoding="UTF-8"?>
<persistence version="2.1" xmlns="http://xmlns.jcp.org/xml/ns/persistence" xmlns:xsi=
↪ "http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="http://xmlns.jcp.
↪ org/xml/ns/persistence http://xmlns.jcp.org/xml/ns/persistence/persistence_2_1.xsd">
  <persistence-unit name="DSProductCatalogPU" transaction-type="JTA">
    <jta-data-source>jdbc/pcatv2</jta-data-source>
    <exclude-unlisted-classes>false</exclude-unlisted-classes>
    <properties>
      <property name="javax.persistence.schema-generation.database.action"
↪ value="drop-and-create"/>
    </properties>
  </persistence-unit>
</persistence>
```

Note that you should provide in the tag `jta-data-source` the name you want for your database connection resource, taking into account that it must be unique for each API.

The next step is creating the database for you API.

```
$ mysql-u <user> -p<passwd> "CREATE DATABASE IF NOT EXISTS <database>"
```

Note: You have to provide your own credentials and the selected database name to the previous command.

Once that the database has been created, the next step is creating the connection pool in Glassfish. To do that, you can use the following command:

```
$ asadmin create-jdbc-connection-pool --restype java.sql.Driver --driverclassname com.
↪ mysql.jdbc.Driver --property user=<user>:password=<passwd>:URL=jdbc:mysql://<host>:
↪ <port>/<database> <poolname>
```

Note: You have to provide you own database credentials, the database host, the database port, the database name of the one created previously, and a name for your pool

The last step for creating the database connection is creating the connection resource. To do that, execute the following command:

```
$ asadmin create-jdbc-resource --connectionpoolid <poolname> <jndiname>
```

Note: You have to provide the name of the pool you have previously created and a name for your resource, which has to be the same as the included in the `jta-data-source` tag of the `persistence.xml` file of the API.

When the database connection has been created, the next step is compiling the API sources with Maven

```
$ mvn install
```

Finally, the last step is deploying the generated war file in Glassfish

```
$ asadmin deploy --contextroot <root> --name <root> target/<WAR.war>
```

Note: You have to provide the wanted context root for the API, a name for it, and the path to the war file

Installing the RSS

The RSS sources can be found in [GitHub](#)

The first step for installing the RSS component is downloading it and moving to the correct release

```
$ git clone https://github.com/FIWARE-TMForum/business-ecosystem-rss.git
$ cd business-ecosystem-rss
$ git checkout v7.8.0
```

Then, the next step is coping, *database.properties* and *oauth.properties* files to its default location at */etc/default/rss*

```
$ sudo mkdir /etc/default/rss
$ sudo chown <your_user>:<your_user> /etc/default/rss
$ cp properties/database.properties /etc/default/rss/database.properties
$ cp properties/oauth.properties /etc/default/rss/ouath.properties
```

Note: You have to include your user when changing *rss* directory owner

Once the properties files have been copied, they should be edited in order to provide the correct configuration params:

database.properties

```
database.url=jdbc:mysql://localhost:3306/RSS
database.username=root
database.password=root
database.driverClassName=com.mysql.jdbc.Driver
```

oauth.properties

```
config.grantedRole=Provider
config.sellerRole=Seller
config.aggregatorRole=aggregator
```

Note: The different params included in the configuration file are explained in detail in the Configuration section

Once the properties files have been edited, the next step is compiling the sources with Maven

```
$ mvn install
```

Finally, the last step is deploying the generated war file in Glassfish

```
$ asadmin deploy --contextroot DSRevenueSharing --name DSRevenueSharing fiware-rss/
↳target/DSRevenueSharing.war
```

Installing the Charging Backend

The Charging Backend sources can be found in [GitHub](#)

The first step for installing the charging backend component is downloading it and moving to the correct release

```
$ git clone https://github.com/FIWARE-TMForum/business-ecosystem-charging-backend.git
$ cd business-ecosystem-charging-backend
$ git checkout v7.8.0
```

Once the code has been downloaded, it is recommended to create a virtualenv for installing python dependencies (This is not mandatory).

```
$ virtualenv virtenv
$ source virtenv/bin/activate
```

To install python libs, execute the *python-dep-install.sh* script

```
$ ./python-dep-install.sh
```

Note: If you have not created and activated a virtualenv you will need to execute the script using `sudo`

Configure Apache for running the Charging Backend

The Charging Backend is a Django App that can be deployed in different ways. In this case, this installation guide covers two different mechanisms: using the Django *runserver* command (as seen in *Running the Charging Backend* section) or deploying it using an Apache server. This section explains how to configure Apache and the Charging Backend to do the later.

The first step is installing Apache and mod-wsgi. In Ubuntu/Debian:

```
$ sudo apt-get install apache2 libapache2-mod-wsgi
```

Or in CentOS:

```
$ sudo yum install httpd mod_wsgi
```

The next step is populating the file *src/wsgi.py* provided with the Charging Backend

```
import os
import sys

path = 'charging_path/src'
if path not in sys.path:
    sys.path.insert(0, path)

os.environ['DJANGO_SETTINGS_MODULE'] = 'settings'

import django.core.handlers.wsgi
application = django.core.handlers.wsgi.WSGIHandler()
```

If you are using a virtualenv, then you will need to include its activation in your *wsgi.py* file, so it should look similar to the following:

```
import os
import sys
import site

site.addsitedir('virtualenv_path/local/lib/python2.7/site-packages')
path = 'charging_path/src'
if path not in sys.path:
    sys.path.insert(0, path)

os.environ['DJANGO_SETTINGS_MODULE'] = 'settings'

# Activate your virtual env
activate_env=os.path.expanduser('virtualenv_path/bin/activate_this.py')
execfile(activate_env, dict(__file__=activate_env))

import django.core.handlers.wsgi
application = django.core.handlers.wsgi.WSGIHandler()
```

Note: Pay special attention to *charging_path* and *virtualenv_path* which have to point to the Charging Backend and the virtualenv paths respectively.

Once WSGI has been configured in the Charging Backend, the next step is creating a virtualhost in Apache. To do that, you can create a new site configuration file in the Apache related directory (located in */etc/apache2/sites-available/* in an Ubuntu/Debian system or in */etc/httpd/conf.d* in a CentOS system) and populate it with the following content:

```
<VirtualHost *:8006>
    WSGIDaemonProcess char_process
    WSGIScriptAlias / charging_path/src/wsgi.py
    WSGIProcessGroup char_process
    WSGIPassAuthorization On

    WSGIApplicationGroup %{GLOBAL}
</VirtualHost>
```

Note: Pay special attention to *charging_path* which have to point to the Charging Backend path.

Depending on the version of Apache you are using, you may need to explicitly allow the access to the directory where the Charging Backend is deployed in the configuration of the virtualhost. To do that, add the following lines to your virtualhost:

Apache version < 2.4

```
<Directory charging_path/src>
    Order deny,allow
    Allow from all
</Directory>
```

Apache version 2.4+

```
<Directory charging_path/src>
    Require all granted
</Directory>
```

Once you have included the new virtualhost configuration, the next step is configuring Apache to listen in the selected port (8006 in the example). To do that, edit `/etc/apache2/ports.conf` in Ubuntu/Debian or `/etc/httpd/conf/httpd.conf` in CentOS and include the following line:

```
Listen 8006
```

Then, in Ubuntu/Debian systems, enable the site by linking the configuration file to the *sites-enabled* directory:

```
ln -s ../sites-available/001-charging.conf ../sites-enabled/001-charging.conf
```

Once you have the site enabled, restart Apache. In Ubuntu/Debian

```
$ sudo service apache2 restart
```

Or in CentOS

```
$ sudo apachectl restart
```

Note: Ensure that the directory where the Charging Backend is installed can be accessed by the Apache user (`www-data` in Ubuntu/Debian, and `apache` in CentOS)

Installing the Logic Proxy

The Logic Proxy sources can be found in [GitHub](#)

The first step for installing the logic proxy component is downloading it and moving to the correct release

```
$ git clone https://github.com/FIWARE-TMForum/business-ecosystem-logic-proxy.git
$ cd business-ecosystem-logic-proxy
$ git checkout v7.8.0
```

Once the code has been downloaded, Node dependencies can be installed with the provided script as follows

```
$ ./install.sh
```

1.1.2 Final steps

Media and Indexes

The Business API Ecosystem, allows to upload some product attachments and assets to be sold. These assets are uploaded by the Charging Backend that saves them in the file system, jointly with the generated PDF invoices.

In this regard, the directories `src/media`, `src/media/bills`, and `src/media/assets` must exist within the Charging Backend directory, and must be writable by the user executing the Charging Backend.

```
$ mkdir src/media
$ mkdir src/media/bills
$ mkdir src/media/assets
$ chown -R <your_user>:<your_user> src/media
```

Additionally, the Business API Ecosystem uses indexes for efficiency and pagination. In this regards, the directory *indexes* must exist within the Logic Proxy directory, and must be writable by the user executing it.

```
$ mkdir indexes
$ chown -R <your_user>:<your_user> indexes
```

You can populate at any time the indexes directory using the *fill_indexes.js* script provided with the Logic Proxy.

```
$ node fill_indexes.js
```

1.1.3 Running the Business API Ecosystem

Running the APIs and the RSS

Both the TM Forum APIs and the RSS are deployed in Glassfish; in this regard, the only step for running them is starting Glassfish

```
$ asadmin start-domain
```

Running the Charging Backend

The Charging Backend creates some objects and connections on startup; in this way, the Glassfish APIs must be up and running before starting it.

Using Django runserver

The Charging Backend can be started using the *runserver* command provided with Django as follows

```
$ ./manage.py runserver 127.0.0.1:<charging_port>
```

Or in background

```
$ nohup ./manage.py runserver 127.0.0.1:<charging_port> &
```

Note: If you have created a virtualenv when installing the backend or used the installation script, you will need to activate the virtualenv before starting the Charging Backend

Using Apache

If you have deployed the charging backend in Apache, you can start it with the following command in a Debian/Ubuntu system

```
$ sudo service apache2 start
```

Or in a CentOS system

```
$ sudo apachectl start
```

Running the Logic Proxy

The Logic Proxy can be started using Node as follows

```
$ node server.js
```

Or if you want to start it in background:

```
$ nohup node server.js &
```

1.1.4 Sanity check Procedures

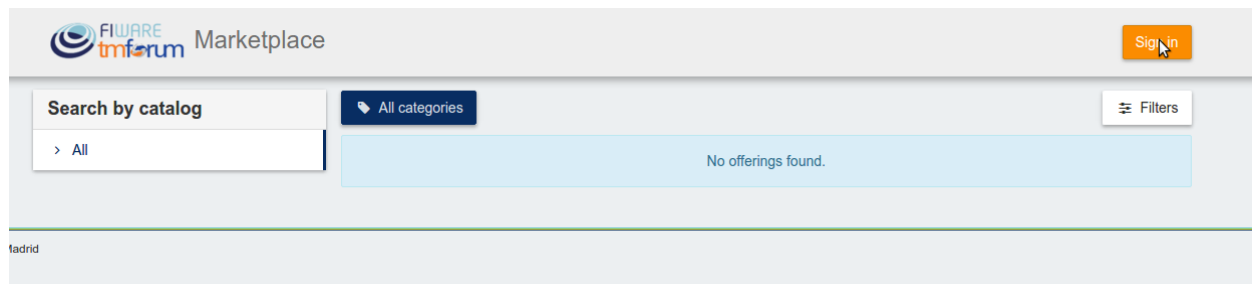
The Sanity Check Procedures are the steps that a System Administrator will take to verify that an installation is ready to be tested. This is therefore a preliminary set of tests to ensure that obvious or basic malfunctioning is fixed before proceeding to unit tests, integration tests and user validation.

End to End Testing

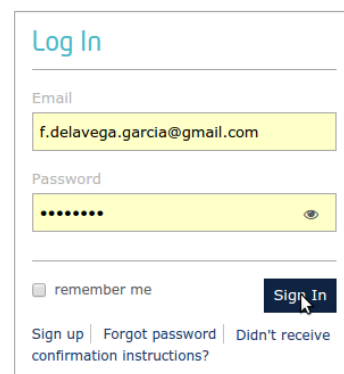
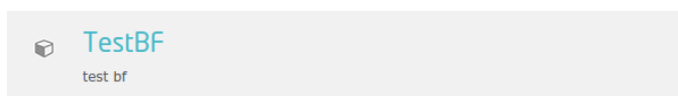
Please note that the following information is required before starting with the process: * The host and port where the Proxy is running * A valid IdM user with the *Seller* role

To Check if the Business API Ecosystem is running, follow the next steps:

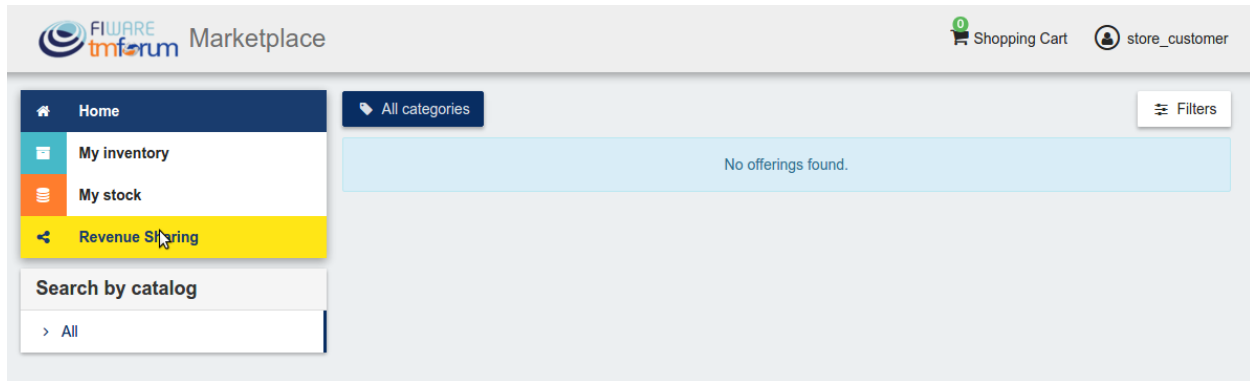
1. Open a browser and enter to the Business API Ecosystem
2. Click on the *Sign In* Button



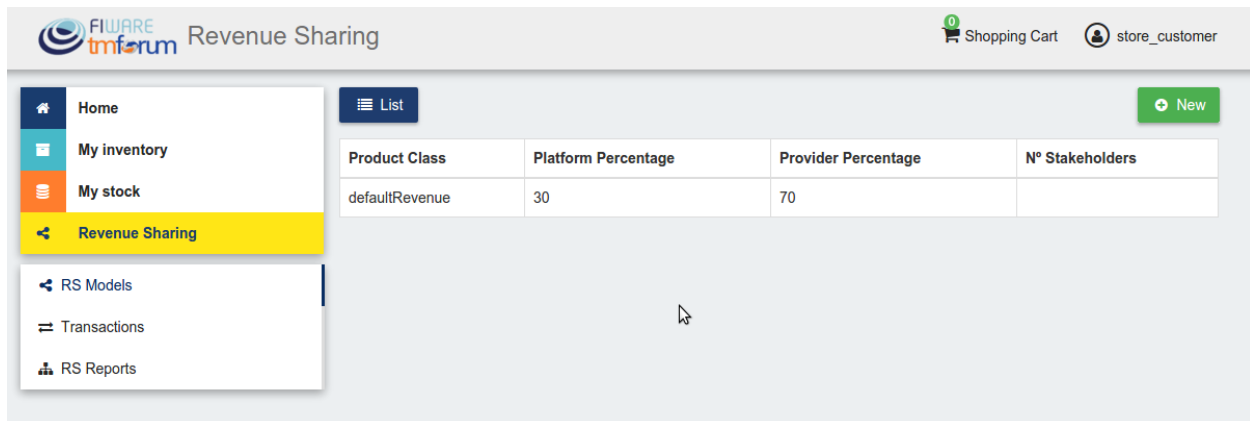
3. Provide your credentials in the IdM page



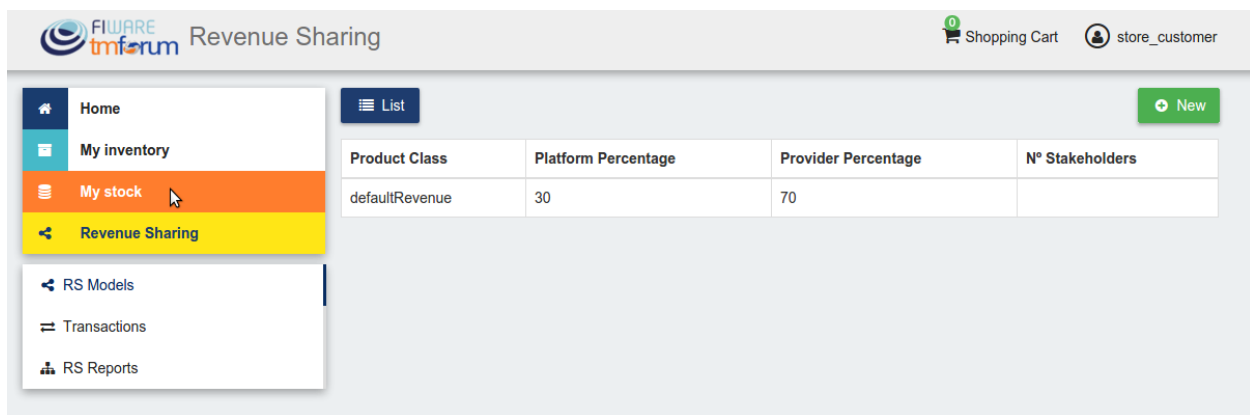
4. Go to the *Revenue Sharing* section



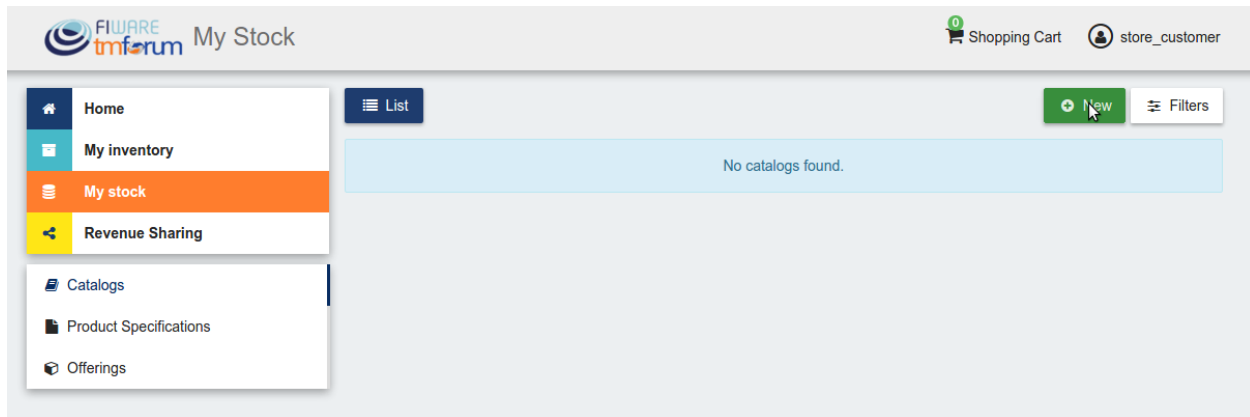
5. Ensure that the default RS Model has been created



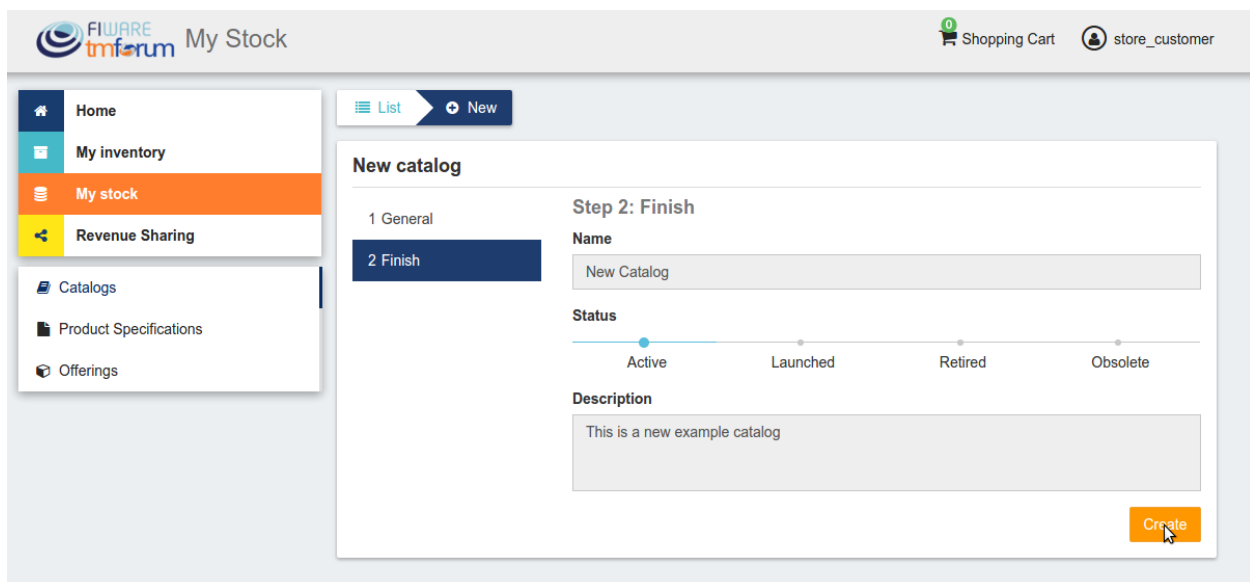
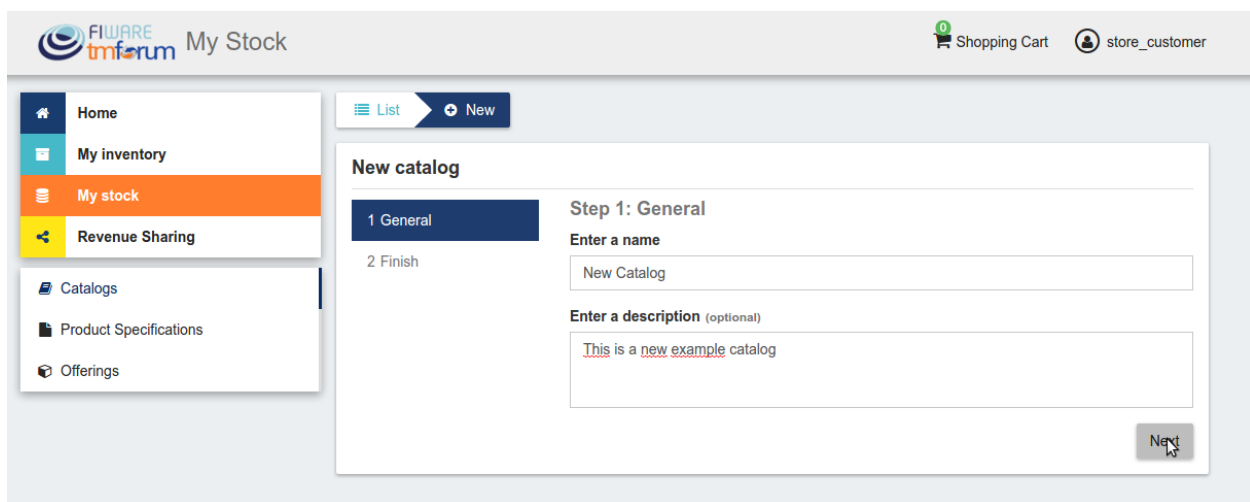
6. Go to *My Stock* section



7. Click on *New* for creating a new catalog



8. Provide a name and a description and click on *Next*. Then click on *Create*



FIWARE **My Stock** Shopping Cart store_customer

Home My inventory My stock Revenue Sharing Catalogs Product Specifications Offerings

List Details

New Catalog

About Parties Offerings

General

Name

New Catalog

Status

Active Launched Retired Obsolete

Description (optional)

This is a new example catalog

Update

9. Click on *Launched*, and then click on *Update*

FIWARE **My Stock** Shopping Cart store_customer

Home My inventory My stock Revenue Sharing Catalogs Product Specifications Offerings

List Details

New Catalog

About Parties Offerings

General

Name

New Catalog

Status

Active Launched Retired Obsolete

Description (optional)

This is a new example catalog

Update

FIWARE My Stock

Shopping Cart store_customer

Home My inventory My stock Revenue Sharing Catalogs Product Specifications Offerings

List Details

New Catalog

About Parties Offerings

General

Name

New Catalog

Status

Active Launched Retired Obsolete

Description (optional)

This is a new example catalog

Update

10. Go to *Home*, and ensure the new catalog appears

FIWARE My Stock

Shopping Cart store_customer

Home My inventory My stock Revenue Sharing Catalogs Product Specifications Offerings

List Details

New Catalog

About Parties Offerings

General

Name

New Catalog

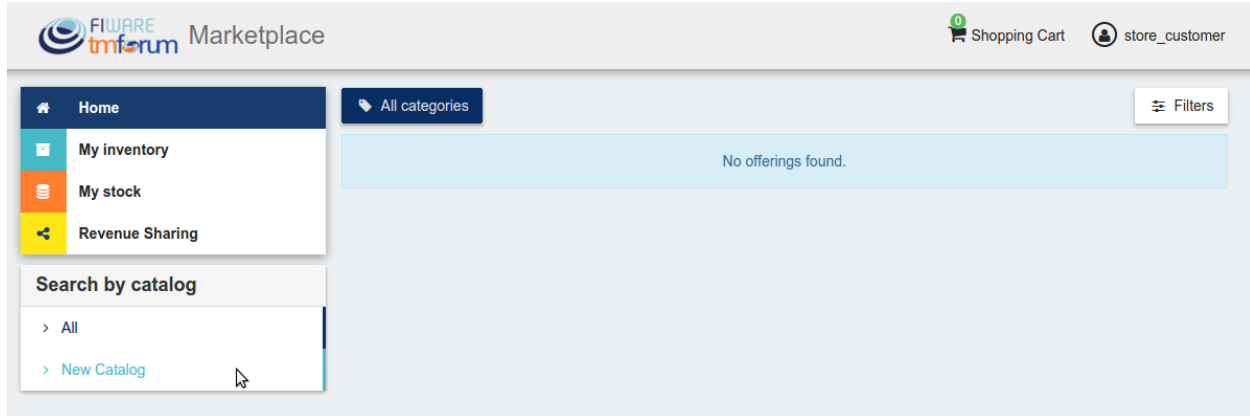
Status

Active Launched Retired Obsolete

Description (optional)

This is a new example catalog

Update



List of Running Processes

We need to check that Java for the Glassfish server (APIs and RSS), python (Charging Backend) and Node (Proxy) are running, as well as MongoDB and MySQL databases. If we execute the following command:

```
ps -ewF | grep 'java\|mongodb\|mysql\|python\|node' | grep -v grep
```

It should show something similar to the following:

```
mongodb  1014      1  0 3458593 49996 0 sep08 ?          00:22:30 /usr/bin/mongod --
↳config /etc/mongodb.conf
mysql    1055      1  0 598728 64884 2 sep08 ?          00:02:21 /usr/sbin/mysqld
francis+ 15932 27745  0 65187 39668  0 14:53 pts/24    00:00:08 python ./manage.py
↳runserver 0.0.0.0:8006
francis+ 15939 15932  1 83472 38968  0 14:53 pts/24    00:00:21 /home/user/business-
↳ecosystem-charging-backend/src/virtenv/bin/python ./manage.py runserver 0.0.0.0:8006
francis+ 16036 15949  0 330473 163556 0 14:54 pts/25    00:00:08 node server.js
root     1572      1  0 1142607 1314076 3 sep08 ?          00:37:40 /usr/lib/jvm/java-8-
↳oracle/bin/java -cp /opt/biz-ecosystem/glassfish ...
```

Network interfaces Up & Open

To check the ports in use and listening, execute the command:

```
$ sudo netstat -nltp
```

The expected results must be something similar to the following:

```
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State       PID/
↳Program name
tcp        0      0 127.0.0.1:8006          0.0.0.0:*                LISTEN      15939/
↳python
tcp        0      0 127.0.0.1:27017         0.0.0.0:*                LISTEN      1014/
↳mongodb
tcp        0      0 127.0.0.1:28017         0.0.0.0:*                LISTEN      1014/
↳mongodb
tcp        0      0 127.0.0.1:3306          0.0.0.0:*                LISTEN      1055/
↳mysqld
tcp6       0      0 :::80                   :::*                    LISTEN      16036/
↳node
```

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tcp6	0	0 :::8686	:::*	LISTEN	1572/
↪ java					
tcp6	0	0 :::4848	:::*	LISTEN	1572/
↪ java					
tcp6	0	0 :::8080	:::*	LISTEN	1572/
↪ java					
tcp6	0	0 :::8181	:::*	LISTEN	1572/
↪ java					

Databases

The last step in the sanity check, once we have identified the processes and ports, is to check that MySQL and MongoDB databases are up and accepting queries. We can check that MySQL is working, with the following command:

```
$ mysql -u <user> -p<password>
```

You should see something similar to:

```
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 174
Server version: 5.5.47-0ubuntu0.14.04.1 (Ubuntu)

Copyright (c) 2000, 2015, Oracle and/or its affiliates. All rights reserved.

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql>
```

For MongoDB, execute the following command:

```
$ mongo <database> -u <user> -p <password>
```

You should see something similar to:

```
MongoDB shell version: 2.4.9
connecting to: <database>
>
```

1.1.5 Diagnosis Procedures

The Diagnosis Procedures are the first steps that a System Administrator will take to locate the source of an error in a GE. Once the nature of the error is identified with these tests, the system admin will very often have to resort to more concrete and specific testing to pinpoint the exact point of error and a possible solution. Such specific testing is out of the scope of this section.

Resource Availability

Memory use depends on the number of concurrent users as well as the free memory available and the hard disk. The Business API Ecosystem requires a minimum of 1024 MB of available RAM memory, but 2048 MB of free memory

are recommended. Moreover, the Business API Ecosystem requires at least 15 GB of hard disk space.

Remote Service Access

N/A

Resource Consumption

Resource consumption strongly depends on the load, especially on the number of concurrent users logged in.

- Glassfish main memory consumption should be between 500 MB and 2048 MB
- MongoDB main memory consumption should be between 30 MB and 500 MB
- Python main memory consumption should be between 30 MB and 200 MB
- Node main memory consumption should be between 30 MB and 200 MB
- MySQL main memory consumption should be between 30 MB and 500 MB

I/O Flows

The only expected I/O flow is of type HTTP, on port defined in the Logic Proxy configuration file

1.2 Docker Deployment Guide

This guide covers the deployment of the Business API Ecosystem version 7.8.0 using the Docker images provided in docker hub.

As stated, the Business API Ecosystem is made up of a set of different components which work jointly in order to provide the functionality. In this regard the following images have been defined:

- `fiware/biz-ecosystem-apis`: This image includes all the TMForum APIs and can be found in [Docker Hub](#)
- `fiware/biz-ecosystem-charging-backend`: This image includes the Charging Backend component and can be found in [Docker Hub](#)
- `fiware/biz-ecosystem-logic-proxy`: This image includes the Logic Proxy component and can be found in [Docker Hub](#)
- `fiware/biz-ecosystem-rss`: This image includes the Revenue Sharing Component and can be found in [Docker Hub](#)

The easiest way to deploy the Business API Ecosystem with Docker is using *docker-compose*. The following *docker-compose.yml* file deploys the whole system and databases (A running version of this file can be found in [GitHub](#)):

```
version: '3'
services:
  elasticsearch:
    image: docker.elastic.co/elasticsearch/elasticsearch:7.9.1
    environment:
      - discovery.type=single-node
    ports:
      - "127.0.0.1:9200:9200"
    networks:
      main:
```

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```

mongo:
  image: mongo:3.2
  restart: always
  networks:
    main:
  volumes:
    - ./mongo-data:/data/db

mysql:
  image: mysql:5.7
  restart: always
  volumes:
    - ./mysql-data:/var/lib/mysql
  networks:
    main:
  environment:
    - MYSQL_ROOT_PASSWORD=my-secret-pw
    - MYSQL_DATABASE=RSS

charging:
  image: fiware/biz-ecosystem-charging-backend:v7.8.0
  links:
    - mongo
  depends_on:
    - mongo
  networks:
    main:
      aliases:
        - charging.docker
  ports:
    - 8006:8006
  volumes:
    - ./charging-bills:/business-ecosystem-charging-backend/src/media/bills
    - ./charging-assets:/business-ecosystem-charging-backend/src/media/assets
    - ./charging-plugins:/business-ecosystem-charging-backend/src/plugins
    - ./charging-inst-plugins:/business-ecosystem-charging-backend/src/wstore/
↪asset_manager/resource_plugins/plugins
  environment:
    - BAE_CB_PAYMENT_METHOD=None # paypal or None (testing mode payment_
↪disconnected)
    # - BAE_CB_PAYPAL_CLIENT_ID=client_id
    # - BAE_CB_PAYPAL_CLIENT_SECRET=client_secret

    # ----- Database configuration -----
    - BAE_CB_MONGO_SERVER=mongo
    - BAE_CB_MONGO_PORT=27017
    - BAE_CB_MONGO_DB=charging_db
    # - BAE_CB_MONGO_USER=user
    # - BAE_CB_MONGO_PASS=passwd

    # ----- Roles Configuration -----
    - BAE_LP_OAUTH2_ADMIN_ROLE=admin
    - BAE_LP_OAUTH2_SELLER_ROLE=seller
    - BAE_LP_OAUTH2_CUSTOMER_ROLE=customer

    # ----- Email configuration -----
    - BAE_CB_EMAIL=charging@email.com

```

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```

# - BAE_CB_EMAIL_USER=user
# - BAE_CB_EMAIL_PASS=pass
# - BAE_CB_EMAIL_SMTP_SERVER=smtp.server.com
# - BAE_CB_EMAIL_SMTP_PORT=587

- BAE_CB_VERIFY_REQUESTS=True # Whether or not the BAE validates SSL
↪certificates on requests to external components

# ----- Site configuration -----
- BAE_SERVICE_HOST=http://proxy.docker:8004/ # External URL used to access
↪the BAE
- BAE_CB_LOCAL_SITE=http://charging.docker:8006/ # Local URL of the charging
↪backend

# ----- APIs Connection config -----
- BAE_CB_CATALOG=http://apis.docker:8080/DSPProductCatalog
- BAE_CB_INVENTORY=http://apis.docker:8080/DSPProductInventory
- BAE_CB_ORDERING=http://apis.docker:8080/DSPProductOrdering
- BAE_CB_BILLING=http://apis.docker:8080/DSBillingManagement
- BAE_CB_RSS=http://rss.docker:8080/DSRevenueSharing
- BAE_CB_USAGE=http://apis.docker:8080/DSUsageManagement
- BAE_CB_AUTHORIZE_SERVICE=http://proxy.docker:8004/authorizeService/apiKeys

proxy:
  image: fiware/biz-ecosystem-logic-proxy:v7.8.0
  links:
    - mongo
    - elasticsearch
  depends_on:
    - mongo
    - elasticsearch
  networks:
    main:
      aliases:
        - proxy.docker
  ports:
    - 8004:8004
  volumes:
    - ./proxy-themes:/business-ecosystem-logic-proxy/themes
    - ./proxy-static:/business-ecosystem-logic-proxy/static
    - ./proxy-locales:/business-ecosystem-logic-proxy/locales
  environment:
    - NODE_ENV=development # Deployment in development or in production
    - COLLECT=True # Execute the collect static command on startup

    - BAE_LP_PORT=8004 # Port where the node service is going to run in the
↪container
    - BAE_LP_HOST=proxy.docker # Host where the node service if going to run
↪in the container
      # - BAE_SERVICE_HOST=https://store.lab.fiware.org/ # If provided, this
↪URL specifies the actual URL that is used to access the BAE, when the component is
↪proxied (e.g Apache)
      # - BAE_LP_HTTPS_ENABLED=true # If provided specifies whether the
↪service is running in HTTPS, default: false
      # - BAE_LP_HTTPS_CERT=cert/cert.crt # Certificate for the SSL
↪configuration (when HTTPS enabled is true)
      # - BAE_LP_HTTPS_CA=cert/ca.crt # CA certificate for the SSL
↪configuration (when HTTPS enabled is true)

```

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```

# - BAE_LP_HTTPS_KEY=cert/key.key # Key sfile for the SSL configuration
↪ (when HTTPS enabled is true)
# - BAE_LP_HTTPS_PORT=443 # Port where the service runs when SSL is
↪ enabled (when HTTPS enabled is true)

# ----- OAUTH2 Config -----
- BAE_LP_OAUTH2_SERVER=http://idm.docker:3000 # URL of the FIWARE IDM
↪ used for user authentication
- BAE_LP_OAUTH2_CLIENT_ID=f0ab257d-7456-41e8-bb0a-002148ac0217 # OAuth2
↪ Client ID of the BAE applicaiton
- BAE_LP_OAUTH2_CLIENT_SECRET=d5ea8cce-08ea-4cb2-8379-66bb35020cee #
↪ OAuth Client Secret of the BAE application
- BAE_LP_OAUTH2_CALLBACK=http://proxy.docker:8004/auth/fiware/callback #
↪ Callback URL for receiving the access tokens
- BAE_LP_OAUTH2_ADMIN_ROLE=admin # Role defined in the IDM client app
↪ for admins of the BAE
- BAE_LP_OAUTH2_SELLER_ROLE=seller # Role defined in the IDM client app
↪ for sellers of the BAE
- BAE_LP_OAUTH2_CUSTOMER_ROLE=customer # Role defined in the IDM client
↪ app for customers of the BAE
- BAE_LP_OAUTH2_ORG_ADMIN_ROLE=orgAdmin # Role defined in the IDM client
↪ app for organization admins of the BAE
- BAE_LP_OAUTH2_IS_LEGACY=false # Whether the used FIWARE IDM is version
↪ 6 or lower

# - BAE_LP_THEME=theme # If provided custom theme to be used by the web
↪ site, it must be included in themes volume

# ----- Mongo Config -----
# - BAE_LP_MONGO_USER=user
# - BAE_LP_MONGO_PASS=pass
- BAE_LP_MONGO_SERVER=mongo
- BAE_LP_MONGO_PORT=27017
- BAE_LP_MONGO_DB=belp

- BAE_LP_REVENUE_MODEL=30 # Default market owner precentage for Revenue
↪ Sharing models
- BAE_LP_TAX_RATE=20 # Tax rate applied to offers in the marketplace

# ----- Indexing engine -----
- BAE_LP_INDEX_ENGINE=elasticsearch # Indexig engine: elasticsearch or
↪ local
- BAE_LP_INDEX_URL=elasticsearch:9200 # URL of elasticsearch
- BAE_LP_INDEX_API_VERSION=7 # API version of elasticsearch

# ----- APIs Configuration -----
# If provided, it supports configuring the contection to the different
↪ APIs managed by the logic proxy, by default
# apis.docker, charging.docker and rss.docker domains are configured
# - BAE_LP_ENDPOINT_CATALOG_PATH=DSProductCatalog
# - BAE_LP_ENDPOINT_CATALOG_PORT=8080
# - BAE_LP_ENDPOINT_CATALOG_HOST=apis.docker
# - BAE_LP_ENDPOINT_CATALOG_SECURED=false
# ...

apis:
  image: fiware/biz-ecosystem-apis:v7.6.0

```

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```

restart: always
ports:
  - 4848:4848
  - 8080:8080
links:
  - mysql
depends_on:
  - mysql
networks:
  main:
    aliases:
      - apis.docker
# volumes:
#   - ./apis-conf:/etc/default/tmf/ # Used if not configured by environment
environment:
  - BAE_SERVICE_HOST=http://proxy.docker:8004/
  - MYSQL_ROOT_PASSWORD=my-secret-pw
  - MYSQL_HOST=mysql

rss:
image: fiware/biz-ecosystem-rss:v7.8.0
restart: always
ports:
  - 9999:8080
  - 4444:4848
  - 1111:8181
links:
  - mysql
depends_on:
  - mysql
networks:
  main:
    aliases:
      - rss.docker
# volumes:
#   - ./rss-conf:/etc/default/rss # Used if not configured by environment
environment:
  - BAE_RSS_DATABASE_URL=jdbc:mysql://mysql:3306/RSS
  - BAE_RSS_DATABASE_USERNAME=root
  - BAE_RSS_DATABASE_PASSWORD=my-secret-pw
  - BAE_RSS_DATABASE_DRIVERCLASSNAME=com.mysql.jdbc.Driver
  - BAE_RSS_OAUTH_CONFIG_GRANTEDROLE=admin
  - BAE_RSS_OAUTH_CONFIG_SELLERROLE=seller
  - BAE_RSS_OAUTH_CONFIG_AGGREGATORROLE=Aggregator

networks:
  main:
    external: true

```

Note: The previous example uses an external network called *main*, which need to exist. If you do not want to use such network just remove the network tags

It can be seen that the different images can be configured using different environment variables. For details on the different configuration options, please refer to the [*Configuration Guide*](#)

It can be seen that the different images used as part of the Business API Ecosystem provide several volumes. Following

it is described the different options provided by each image.

The **biz-ecosystem-logic-proxy** image defines 4 volumes. In particular:

- `/business-ecosystem-logic-proxy/indexes`: This volume contains the indexes used by the Business API Ecosystem for searching
- `/business-ecosystem-logic-proxy/themes`: In this volume, it can be provided the themes that can be used to customize the web portal
- `/business-ecosystem-logic-proxy/static`: This volume includes the static files ready to be rendered including the selected theme and js files

Additionally, the **biz-ecosystem-logic-proxy** image defines two environment variables intended to optimize the production deployment of the BAE Logic proxy:

- `NODE_ENV`: Specifies whether the system is in *development* or in *production* (default: *development*)
- `COLLECT`: Specifies if the container should execute the `collect static` command to generate static files or use the existing on start up (default: `True`)

On the other hand, the **biz-ecosystem-charging-backend** image defines 4 volumes. In particular:

- `/business-ecosystem-charging-backend/src/media/bills`: This directory contains the PDF invoices generated by the Business Ecosystem Charging Backend
- `/business-ecosystem-charging-backend/src/media/assets`: This directory contains the different digital assets uploaded by sellers to the Business Ecosystem Charging Backend
- `/business-ecosystem-charging-backend/src/plugins`: This directory is used for providing asset plugins (see section *Installing Asset Plugins*)
- `/business-ecosystem-charging-backend/src/wstore/asset_manager/resource_plugins/plugins`: This directory includes the code of the plugins already installed

1.2.1 Installing Asset Plugins

As you may know, the Business API Ecosystem is able to sell different types of digital assets by loading asset plugins in its Charging Backend. In this context, it is possible to install asset plugins in the current Docker image as follows:

- 1) Copy the plugin file into the host directory of the volume `/business-ecosystem-charging-backend/src/plugins`
- 2) Enter the running container:

```
docker exec -i -t your-container bash
```

- 3) Go to the installation directory

```
cd /business-ecosystem-charging-backend/src
```

- 4) Load the plugin

```
./manage.py loadplugin ./plugins/pluginfile.zip
```

- 5) Restart Apache

```
service apache2 graceful
```

1.3 Configuration Guide

This guide covers the different configuration options that are available in order to setup a working Business API Ecosystem instance. The different Business API Ecosystem components can be configured using two different mechanisms, settings files and environment variables.

At this step, the different components of the Business API Ecosystem are installed. In the case of the TMForum APIs and the RSS, this installation process has already required to configure their database connection before their deployment, so they are already configured. Nevertheless, this section contains an explanation of the function of the different settings of the RSS properties files.

1.3.1 Configuring the TMF APIs

When the TMF APIs are deployed from sources, the connection to the MySQL database is configured during the installation process setting up the jdbc connection as described in the *Installation and Administration* guide.

On the other hand, the Docker image biz-ecosystem-apis, which is used to the deploy TMF APIs using Docker, uses two environment variables for configuring such connection.

```
MYSQL_ROOT_PASSWORD=my-secret-pw
MYSQL_HOST=mysql
```

Finally, the TMF APIs can optionally use a configuration file called *settings.properties* which is located by default at */etc/default/apis*. This file include a setting *server* which allows to provide the URL used to access to the Business API Ecosystem and, in particular, by the APIs in order to generate *hrefs* with the proper reference.

```
server=https://store.lab.fiware.org/
```

This setting can also be configured using the environment variable *BAE_SERVICE_HOST*

```
export BAE_SERVICE_HOST=https://store.lab.fiware.org/
```

1.3.2 Configuring the RSS

The RSS has its settings included in two files located at */etc/default/rss*. The file *database.properties* contains by default the following fields:

```
database.url=jdbc:mysql://localhost:3306/RSS
database.username=root
database.password=root
database.driverClassName=com.mysql.jdbc.Driver
```

This file contains the configuration required in order to connect to the database.

- *database.url*: URL used to connect to the database, this URL includes the host and port of the database as well as the concrete database to be used
- *database.username*: User to be used to connect to the database
- *database.password*: Password of the database user
- *database.driverClassName*: Driver class of the database. By default MySQL

In addition, database settings can be configured using the environment. In particular, using the following variables:

```
export BAE_RSS_DATABASE_URL=jdbc:mysql://mysql:3306/RSS
export BAE_RSS_DATABASE_USERNAME=root
export BAE_RSS_DATABASE_PASSWORD=my-secret-pw
export BAE_RSS_DATABASE_DRIVERCLASSNAME=com.mysql.jdbc.Driver
```

The file *oauth.properties* contains by default the following fields (It is recommended not to modify them)

```
config.grantedRole=admin
config.sellerRole=Seller
config.aggregatorRole=aggregator
```

This file contains the name of the roles (registered in the idm) that are going to be used by the RSS.

- config.grantedRole: Role in the IDM of the users with admin privileges
- config.sellerRole: Role in the IDM of the users with seller privileges
- config.aggregatorRole: Role of the users who are admins of an store instance. In the context of the Business API Ecosystem there is only a single store instance, so you can safely ignore this flag

Those settings can also be configured using the environment as

```
export BAE_RSS_OAUTH_CONFIG_GRANTEDROLE=admin
export BAE_RSS_OAUTH_CONFIG_SELLERROLE=Seller
export BAE_RSS_OAUTH_CONFIG_AGGREGATORROLE=Aggregator
```

1.3.3 Configuring the Charging Backend

The Charging Backend creates some objects and connections in the different APIs while working, so the first step is configuring the different URLs of the Business API Ecosystem components by modifying the file *services_settings.py*, which by default contains the following content:

```
SITE = 'http://localhost:8004/'
LOCAL_SITE = 'http://localhost:8006/'

CATALOG = 'http://localhost:8080/DSPProductCatalog'
INVENTORY = 'http://localhost:8080/DSPProductInventory'
ORDERING = 'http://localhost:8080/DSPProductOrdering'
BILLING = 'http://localhost:8080/DSBillingManagement'
RSS = 'http://localhost:8080/DSRevenueSharing'
USAGE = 'http://localhost:8080/DSUsageManagement'
AUTHORIZE_SERVICE = 'http://localhost:8004/authorizeService/apiKeys'
```

This settings points to the different APIs accessed by the charging backend. In particular:

- SITE: External URL of the complete Business API Ecosystem using for Href creation
- LOCAL_SITE: URL where the Charging Backend is going to run
- CATALOG: URL of the catalog API including its path
- INVENTORY: URL of the inventory API including its path
- ORDERING: URL of the ordering API including its path
- BILLING: URL of the billing API including its path
- RSS: URL of the RSS including its path
- USAGE: URL of the Usage API including its path

- **AUTHORIZE_SERVICE**: Complete URL of the usage authorization service. This service is provided by the logic proxy, and is used to generate API Keys to be used by accounting systems when providing usage information.

These settings can be configured using the following environment variables:

```
BAE_SERVICE_HOST=http://proxy.docker:8004/
BAE_CB_LOCAL_SITE=http://charging.docker:8006/
BAE_CB_CATALOG=http://apis.docker:8080/DSPProductCatalog
BAE_CB_INVENTORY=http://apis.docker:8080/DSPProductInventory
BAE_CB_ORDERING=http://apis.docker:8080/DSPProductOrdering
BAE_CB BILLING=http://apis.docker:8080/DSBillingManagement
BAE_CB_RSS=http://rss.docker:8080/DSRevenueSharing
BAE_CB_USAGE=http://apis.docker:8080/DSUsageManagement
BAE_CB_AUTHORIZE_SERVICE=http://proxy.docker:8004/authorizeService/apiKeys
```

Once the services have been configured, the next step is configuring the database. In this case, the charging backend uses MongoDB, and its connection can be configured modifying the *DATABASES* setting of the *settings.py* file.

```
DATABASES = {
    'default': {
        'ENGINE': 'django_mongodb_engine',
        'NAME': 'wstore_db',
        'USER': '',
        'PASSWORD': '',
        'HOST': '',
        'PORT': '',
        'TEST_NAME': 'test_database',
    }
}
```

This setting contains the following fields:

- **ENGINE**: Database engine, must be fixed to `django_mongodb_engine`
- **NAME**: Name of the database to be used
- **USER**: User of the database. If empty the software creates a non authenticated connection
- **PASSWORD**: Database user password. If empty the software creates a non authenticated connection
- **HOST**: Host of the database. If empty it uses the default *localhost* host
- **PORT**: Port of the database. If empty it uses the default *27017* port
- **TEST_NAME**: Name of the database to be used when running the tests

These settings can be configured using the environment with the following variables:

```
BAE_CB_MONGO_SERVER=mongo
BAE_CB_MONGO_PORT=27017
BAE_CB_MONGO_DB=charging_db
BAE_CB_MONGO_USER=user
BAE_CB_MONGO_PASS=passwd
```

Once the database connection has been configured, the next step is configuring the name of the IdM roles to be used by updating *settings.py*

```
ADMIN_ROLE = 'provider'
PROVIDER_ROLE = 'seller'
CUSTOMER_ROLE = 'customer'
```

This settings contain the following values:

- ADMIN_ROLE: IDM role of the system admin
- PROVIDER_ROLE: IDM role of the users with seller privileges
- CUSTOMER_ROLE: IDM role of the users with customer privileges

These parameters can be configured with the environment using:

```
BAE_LP_OAUTH2_ADMIN_ROLE=admin
BAE_LP_OAUTH2_SELLER_ROLE=seller
BAE_LP_OAUTH2_CUSTOMER_ROLE=customer
```

The charging backend is the component in charge of maintaining the supported currencies and the timeframe of the different periods using in recurring pricing models. To configure both, the following settings are used:

```
CURRENCY_CODES = [
    ('EUR', 'Euro'),
    ('AUD', 'Australia Dollar'),
    ...
]
CHARGE_PERIODS = {
    'daily': 1, # One day
    'weekly': 7, # One week
    'monthly': 30, # One month
    ...
}
```

- CURRENCY_CODES: Includes the list of currencies supported by the system as a tuple of currency code and currency name.
- CHARGE_PERIODS: Includes the list of supported periods for recurring models, specifying the time (in days) between periodic charges

The Charging Backend component is able to send email notifications to the users when they are charged or receive a payment. In this way, it is possible to provide email configuration in the *settings.py* file by modifying the following fields:

```
WSTOREMAILUSER = 'email_user'
WSTOREMAIL = 'wstore_email'
WSTOREMAILPASS = 'wstore_email_passwd'
SMTPSERVER = 'wstore_smtp_server'
SMTPPORT = 587
```

This settings contain the following values: * WSTOREMAILUSER: Username used for authenticating in the email server * WSTOREMAIL: Email to be used as the sender of the notifications * WSTOREMAILPASS: Password of the user for authenticating in the email server * SMTPSERVER: Email server host * SMTPPORT: Email server port

These settings can be configured with the environment using:

```
BAE_CB_EMAIL=charging@email.com
BAE_CB_EMAIL_USER=user
BAE_CB_EMAIL_PASS=pass
BAE_CB_EMAIL_SMTP_SERVER=smtp.server.com
BAE_CB_EMAIL_SMTP_PORT=587
```

Note: The email configuration is optional. However, the field WSTOREMAIL must be provided since it is used

internally for RSS configuration

Additionally, the Charging Backend is the component that charges customers and pays providers. For this purpose it uses PayPal. For configuring paypal, the first step is setting `PAYMENT_METHOD` to `paypal` in the `settings.py` file

```
PAYMENT_METHOD = 'paypal'
```

Then, it is required to provide PayPal application credentials by updating the file `src/wstore/charging_engine/payment_client/paypal_client.py`

```
PAYPAL_CLIENT_ID = ''
PAYPAL_CLIENT_SECRET = ''
MODE = 'sandbox' # sandbox or live
```

These settings contain the following values:

- `PAYPAL_CLIENT_ID`: Id of the application provided by PayPal
- `PAYPAL_CLIENT_SECRET`: Secret of the application provided by PayPal
- `MODE`: Mode of the connection. It can be `sandbox` if using the PayPal sandbox for testing the system. Or `live` if using the real PayPal APIs

In addition, these settings can be configured using the following environment variables:

```
BAE_CB_PAYMENT_METHOD=paypal
BAE_CB_PAYPAL_CLIENT_ID=client_id
BAE_CB_PAYPAL_CLIENT_SECRET=client_secret
```

Moreover, the Charging Backend is the component that activates the purchased services. In this regard, the Charging Backend has the possibility of signing its acquisition notifications with a certificate, so the external system being offered can validate that is the Charging Backend the one making the request. To use this functionality it is needed to configure the certificate and the private Key to be used by providing its path in the following settings of the `settings.py` file

```
NOTIF_CERT_FILE = None
NOTIF_CERT_KEY_FILE = None
```

The Charging Backend uses a Cron task to check the status of recurring and usage subscriptions, and for paying sellers. The periodicity of this tasks can be configured using the `CRONJOBS` setting of `settings.py` using the standard Cron format

```
CRONJOBS = [
    ('0 5 * * *', 'django.core.management.call_command', ['pending_charges_daemon']),
    ('0 6 * * *', 'django.core.management.call_command', ['resend_cdrs']),
    ('0 4 * * *', 'django.core.management.call_command', ['resend_upgrade'])
]
```

Once the Cron task has been configured, it is necessary to include it in the Cron tasks using the command:

```
$ ./manage.py crontab add
```

It is also possible to show current jobs or remove jobs using the commands:

```
$ ./manage.py crontab show
$ ./manage.py crontab remove
```

1.3.4 Configuring the Logic Proxy

Configuration of the Logic Proxy is located at *config.js* and can be provided in two different ways: providing the values in the file or using the defined environment variables. Note that the environment variables override the values in *config.js*.

The first setting to be configured is the port and host where the proxy is going to run, this settings are located in *config.js*

```
config.port = 80;
config.host = 'localhost';
```

In addition, the environment variables *BAE_LP_PORT* and *BAE_LP_HOST* can be used to override those values.

```
export BAE_LP_PORT=80
export BAE_LP_HOST=localhost
```

If you want to run the proxy in HTTPS you can update *config.https* setting

```
config.https = {
  enabled: false,
  certFile: 'cert/cert.crt',
  keyFile: 'cert/key.key',
  caFile: 'cert/ca.crt',
  port: 443
};
```

In this case you have to set *enabled* to true, and provide the paths to the certificate (*certFile*), to the private key (*keyFile*), and to the CA certificate (*caFile*).

In order to provide the HTTPS configuration using the environment, the following variables has been defined.

```
export BAE_LP_HTTPS_ENABLED=true
export BAE_LP_HTTPS_CERT=cert/cert.crt
export BAE_LP_HTTPS_CA=cert/key.key
export BAE_LP_HTTPS_KEY=cert/ca.crt
export BAE_LP_HTTPS_PORT=443
```

The logic proxy supports the BAE to be deployed behind a proxy (or NGINX, Apache, etc) not sending X-Forwarding headers. In this regard, the following setting is used in order to provide information about the actual endpoint which is used to access to the Business API Ecosystem:

```
config.proxy = {
  enabled: true,
  host: 'store.lab.fiware.org',
  secured: true,
  port: 443
};
```

Which can be also configured using the *BAE_SERVICE_HOST* environment variable.

```
export BAE_SERVICE_HOST=https://store.lab.fiware.org/
```

Then, it is possible to modify some of the URLs of the system. In particular, it is possible to provide a prefix for the API, a prefix for the portal, and modifying the login and logout URLs

```
config.proxyPrefix = '';
config.portalPrefix = '';
config.logInPath = '/login';
config.logOutPath = '/logout';
```

In addition, it is possible to configure the theme to be used by providing its name. Details about the configuration of Themes are provided in the *Configuring Themes* section:

```
config.theme = '';
```

The theme can be configured using the *BAE_LP_THEME* variable.

```
export BAE_LP_THEME=fiwaretheme
```

Additionally, the proxy is the component that acts as the front end of the Business API Ecosystem, both providing a web portal, and providing the endpoint for accessing to the different APIs. In this regard, the Proxy has to have the OAuth2 configuration of the FIWARE IDM.

To provide OAuth2 configuration, an application has to be created in an instance of the FIWARE IdM (e.g <https://account.lab.fiware.org>), providing the following information:

- URL: `httphttps://<proxy_host>:<proxy_port>`
- Callback URL: `httphttps://<PROXY_HOST>:<PROXY_PORT>/auth/fiware/callback`
- Create a role *Seller*, a role *Admin*, and a role *orgAdmin*

Once the application has been created in the IdM, it is possible to provide OAuth2 configuration by modifying the following settings

```
config.oauth2 = {
  'server': 'https://account.lab.fiware.org',
  'clientID': '<client_id>',
  'clientSecret': '<client_secret>',
  'callbackURL': 'http://<proxy_host>:<proxy_port>/auth/fiware/callback',
  'isLegacy': false,
  'roles': {
    'admin': 'admin',
    'customer': 'customer',
    'seller': 'seller',
    'orgAdmin': 'orgAdmin'
  }
};
```

In this settings, it is needed to include the IDM instance being used (*server*), the client id given by the IdM (*clientID*), the client secret given by the IdM (*clientSecret*), and the callback URL configured in the IdM (*callbackURL*).

In addition, the different roles allow to specify what users are admins of the system (*Admin*), what users can create products and offerings (*Seller*), and what users are admins of a particular organization, enabling to manage its information (*orgAdmin*). Note that while *admin* and *seller* roles are granted directly to the users in the Business API Ecosystem application, the *orgAdmin* role has to be granted to users within IdM organizations.

Note: Admin, Seller, and orgAdmin roles are configured in the Proxy settings, so any name can be chosen for them in the IDM

The *isLegacy* flag is used to specify whether the configured IDM is version 6 or lower, by default this setting is false.

The OAuth2 settings can be configured using the environment as follows:

```
export BAE_LP_OAUTH2_SERVER=https://account.lab.fiware.org
export BAE_LP_OAUTH2_CLIENT_ID=client_id
export BAE_LP_OAUTH2_CLIENT_SECRET=client_secret
export BAE_LP_OAUTH2_CALLBACK=http://<proxy_host>:<proxy_port>/auth/fiware/callback
export BAE_LP_OAUTH2_ADMIN_ROLE=admin
export BAE_LP_OAUTH2_SELLER_ROLE=seller
export BAE_LP_OAUTH2_ORG_ADMIN_ROLE=orgAdmin

export BAE_LP_OAUTH2_IS_LEGACY=false
```

Moreover, the Proxy uses MongoDB for maintaining some info, such as the current shopping cart of a user. you can configure the connection to MongoDB by updating the following setting:

```
config.mongodb = {
  server: 'localhost',
  port: 27017,
  user: '',
  password: '',
  db: 'belp'
};
```

In this setting you can configure the host (*server*), the port (*port*), the database user (*user*), the database user password (*password*), and the database name (*db*).

In addition, the database connection can be configured with the environment as following:

```
export BAE_LP_MONGO_USER=user
export BAE_LP_MONGO_PASS=pass
export BAE_LP_MONGO_SERVER=localhost
export BAE_LP_MONGO_PORT=27017
export BAE_LP_MONGO_DB=belp
```

As already stated, the Proxy is the component that acts as the endpoint for accessing the different APIs. In this way, the proxy needs to know the URLs of them in order to redirect the different requests. This endpoints can be configured using the following settings

```
config.endpoints = {
  'catalog': {
    'path': 'DSProductCatalog',
    'host': 'localhost'
    'port': '8080',
    'appSsl': false
  },
  'ordering': {
    'path': 'DSProductOrdering',
    'host': 'localhost'
    'port': '8080',
    'appSsl': false
  },
  ...
}
```

The setting *config.endpoints* contains the specific configuration of each of the APIs, including its *path*, its *host*, its *port*, and whether the API is using SSL or not.

Note: The default configuration included in the config file is the one used by the installation script, so if you have

used the script for installing the Business API Ecosystem you do not need to modify these fields

Each of the different APIs can be configured with environment variables with the following pattern:

```
export BAE_LP_ENDPOINT_CATALOG_PATH=DSProductCatalog
export BAE_LP_ENDPOINT_CATALOG_PORT=8080
export BAE_LP_ENDPOINT_CATALOG_HOST=localhost
export BAE_LP_ENDPOINT_CATALOG_SECURED=false
```

The Business API Ecosystem uses an indexes system managed by the Logic Proxy in order to perform queries, searches, and paging the results. Starting in version 7.6.0 it is possible to use elasticsearch for the indexing rather than using the local file system. The indexing system is configured with the following settings.

```
config.indexes = {
  'engine': 'elasticsearch', // local or elasticsearch
  'elasticHost': 'elastic.docker:9200'
  'apiVersion': '7.5'
};
```

The *engine* setting can be used to chose between *local* indexes and *elasticsearch* indexes. If the later is chosen the URL of elasticsearch is provided with *elasticHost*.

These settings can be configured using the environment as follows:

```
export BAE_LP_INDEX_ENGINE=elasticsearch
export BAE_LP_INDEX_URL=elasticsearch:9200
export BAE_LP_INDEX_API_VERSION=7
```

Finally, there are two fields that allow to configure the behaviour of the system while running. On the one hand, *config.revenueModel* allows to configure the default percentage that the Business API Ecosystem is going to retrieve in all the transactions. On the other hand, *config.usageChartURL* allows to configure the URL of the chart to be used to display product usage to customers in the web portal. They can be configured with environment variables with *BAE_LP_REVENUE_MODEL* and *BAE_LP_USAGE_CHART*

1.3.5 Configuring Themes

The Business API Ecosystem provides a basic mechanism for the creation of themes intended to customize the web portal of the system. Themes include a set of files which can override any of the default portal files located in the *public/resources* or *views* directories of the logic proxy. To do that, themes map the directory structure and include files with the same name of the default ones to be overridden.

The Logic Proxy can include multiple themes which should be stored in the *themes* directory located at the root of the project.

To enable themes, the *config.theme* setting is provided within the *config.js* file of the Logic Proxy. Themes are enabled by providing the name of the theme directory in this setting.

```
config.theme = 'dark-theme';
```

Note: Setting *config.theme* to an empty string makes the Business API Ecosystem to use its default theme

To start using a theme the following command has to be executed:

```
$ node collect_static.js
```

This command merges the theme files and the default ones into a *static* directory used by the Logic Proxy to retrieve portal static files.

1.3.6 Enabling Production

The default installation of the Business API Ecosystem deploys its different components in *debug* mode. This is useful for development and testing but it is not adequate for production environments.

Enabling the production mode makes the different components to start caching requests and views and minimizing JavaScript files.

To enable the production mode, the first step is setting the environment variable *NODE_ENV* to *production* in the machine containing the Logic Proxy.

```
$ export NODE_ENV=production
```

Then, it is needed to collect static files in order to compress JavaScript files.

```
$ node collect_static.js
```

Finally, change the setting *DEBUG* of the Charging Backend to False.

```
DEBUG=False
```

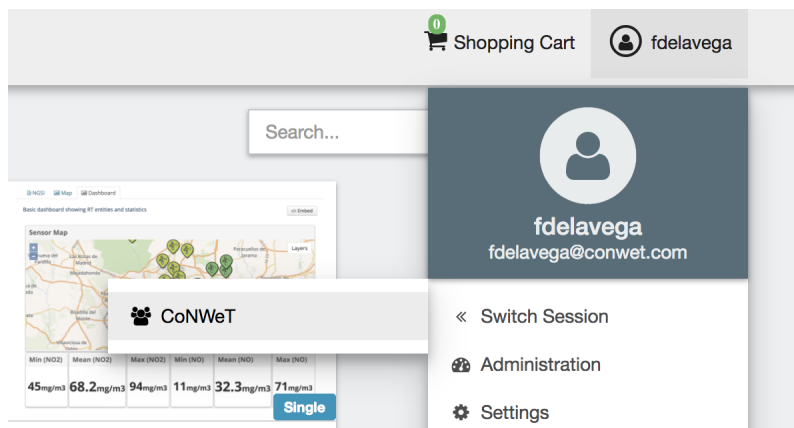
1.4 User Guide

This user guide contains a description of the different tasks that can be performed in the Business API Ecosystem using its web interface. This section is organized so the actions related to a particular user role are grouped together.

1.4.1 Using Organizations

The Business API Ecosystem supports organizations as defined by the FIWARE IdM. These organizations can use the system as if they were users, being possible to create organizations catalogs and offerings or acquire them.

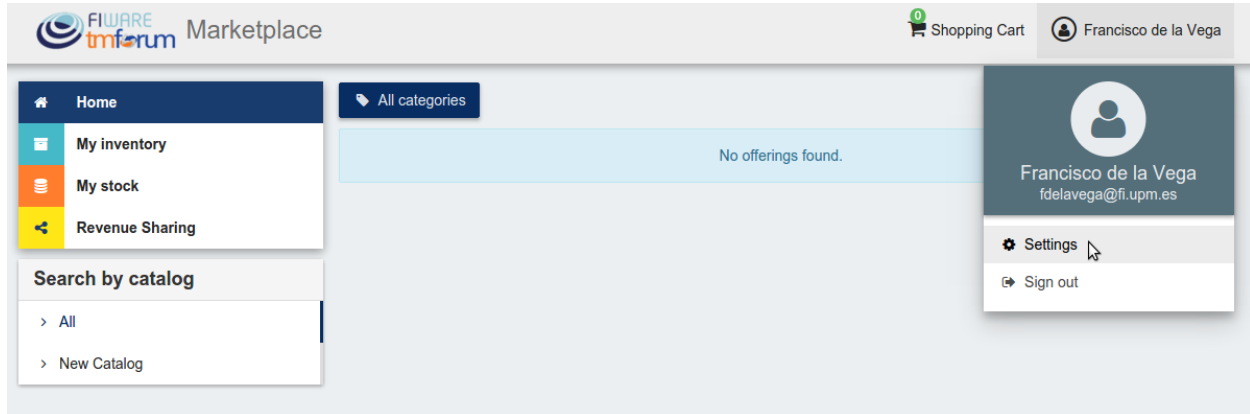
To use the platform on behalf an organization the user belongs, it is needed to change the platform context. To do that, it is used the *Switch Session* option of the user menu.



1.4.2 Profile Configuration

All the users of the system can configure their profile, so they can configure their personal information as well as their billing addresses and contact mediums.

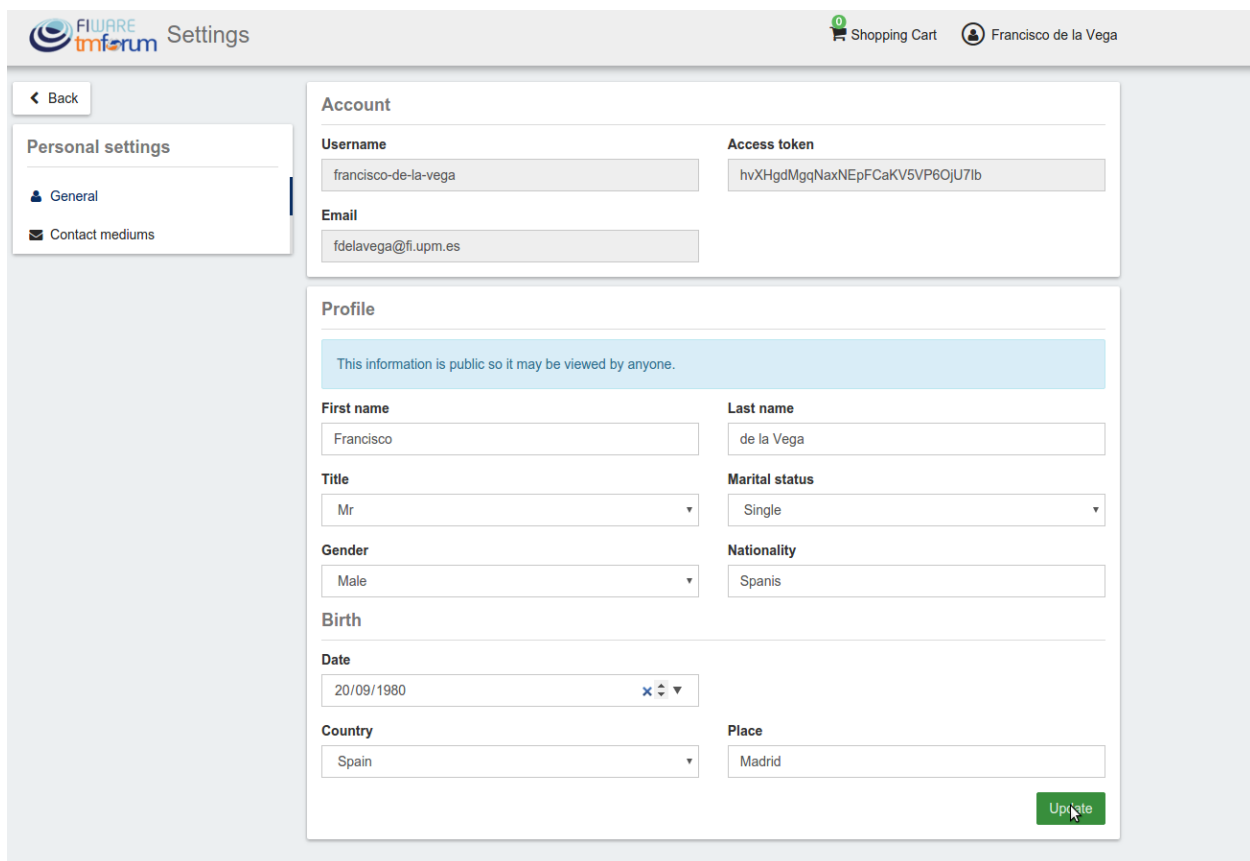
To configure the user profile, the first step is opening the user *Settings* located in the user menu.



In the displayed view, it can be seen that some information related to the account is already included (*Username*, *Email*, *Access token*). This information is the one provided by the IdM after the login process.

The profile to be updated depends on whether the user is acting on behalf an organization or himself. In both cases, to update the profile, fill in the required information and click on *Update*.

For users, personal information is provided.



Note: Only the *First name* and *Last name* fields are mandatory

For organizations, general organization info is provided.

The screenshot shows the 'Settings' page for a user in the FIWARE tmforum. The page has a header with the FIWARE tmforum logo and 'Settings' text. On the right, there are links for 'Shopping Cart' and 'CoNWeT'. A left sidebar contains a 'Back' button and a 'Personal settings' section with 'General' and 'Contact mediums' options. The main content area is divided into two sections: 'Account' and 'Profile'. The 'Account' section contains fields for 'Username' (fdelavega), 'Access token' (YsHsbnlZrTCY2bKB7ZVqvXhYaCTAb4), and 'Email' (fdelavega@conwet.com). The 'Profile' section has a warning that information is public, followed by fields for 'Trading Name' (CoNWeT), 'Type' (Non-profit), 'Legal' section with 'CIF or Organization ID' (06657654Z) and 'Type' (VAT), and 'Issuing Authority' (Spain) and 'Issuing Date' (10/09/1996). An 'Update' button is at the bottom right of the profile section.

Account	
Username	Access token
fdelavega	YsHsbnlZrTCY2bKB7ZVqvXhYaCTAb4
Email	
fdelavega@conwet.com	

Profile	
This information is public so it may be viewed by anyone.	
Trading Name	Type
CoNWeT	Non-profit
Legal	
CIF or Organization ID	Type
06657654Z	VAT
Issuing Authority	Issuing Date
Spain	10/09/1996
Update	

Once you have created your profile, you can include contact mediums by going to the *Contact mediums* section.

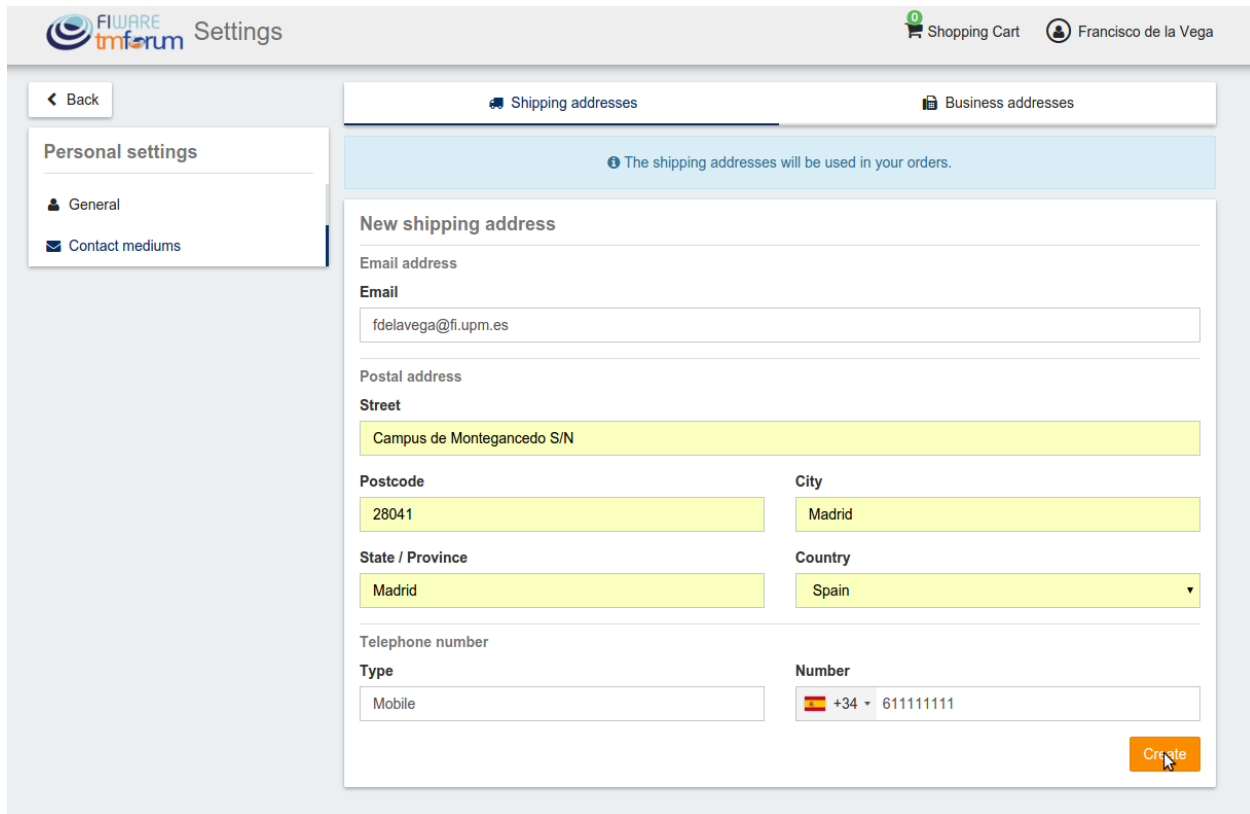
The screenshot shows the 'Settings' page of the FIWARE Inforum application. The top navigation bar includes the FIWARE Inforum logo, the word 'Settings', a shopping cart icon with '0' items, and a user profile icon for 'Francisco de la Vega'. On the left, a sidebar contains a 'Back' button and a 'Personal settings' menu with 'General' and 'Contact mediums' options. The main content area is divided into two sections: 'Account' and 'Profile'. The 'Account' section has fields for 'Username' (francisco-de-la-vega), 'Access token' (hvXHgdMgqNaxNEpFCaKV5VP6OjU7Ib), and 'Email' (fdelavega@fi.upm.es). The 'Profile' section includes a public information warning and fields for 'First name' (Francisco), 'Last name' (de la Vega), 'Title' (Mr), 'Marital status' (Single), 'Gender' (Male), 'Nationality' (Spanis), 'Birth' date (20/09/1980), 'Country' (Spain), and 'Place' (Madrid). An 'Update' button is located at the bottom right of the profile section.

Account	
Username	Access token
francisco-de-la-vega	hvXHgdMgqNaxNEpFCaKV5VP6OjU7Ib
Email	
fdelavega@fi.upm.es	

Profile	
This information is public so it may be viewed by anyone.	
First name	Last name
Francisco	de la Vega
Title	Marital status
Mr	Single
Gender	Nationality
Male	Spanis
Birth	
Date	
20/09/1980	
Country	Place
Spain	Madrid
Update	

In the *Contact Medium* section, there are two different tabs. On the one hand, the *Shipping addresses* tab, where you can register the shipping addresses you will be able to use when creating orders and purchasing products.

To create a shipping address, fill in the fields and click on *Create*



FIWARE inforum Settings

Shopping Cart Francisco de la Vega

Back

Shipping addresses Business addresses

The shipping addresses will be used in your orders.

New shipping address

Email address

Email

fdelavega@fi.upm.es

Postal address

Street

Campus de Montegancedo S/N

Postcode

28041

City

Madrid

State / Province

Madrid

Country

Spain

Telephone number

Type

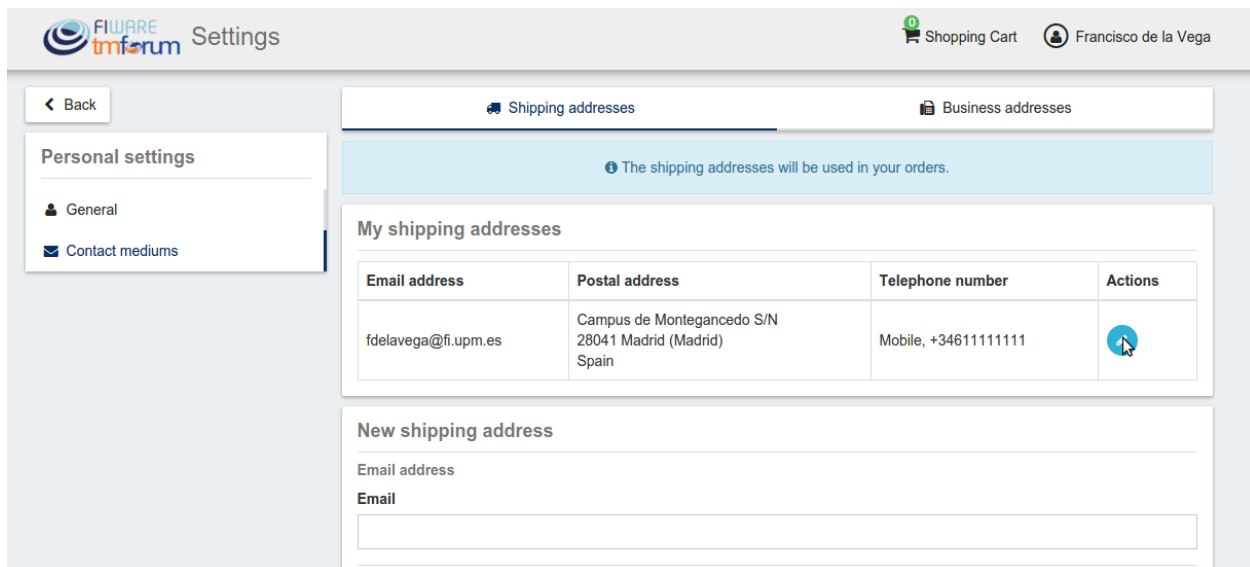
Mobile

Number

+34 611111111

Create

Once created, you can edit the address by clicking on the *Edit* button of the specific address, and changing the wanted fields.



FIWARE inforum Settings


Shopping Cart Francisco de la Vega

Back

Shipping addresses Business addresses

The shipping addresses will be used in your orders.

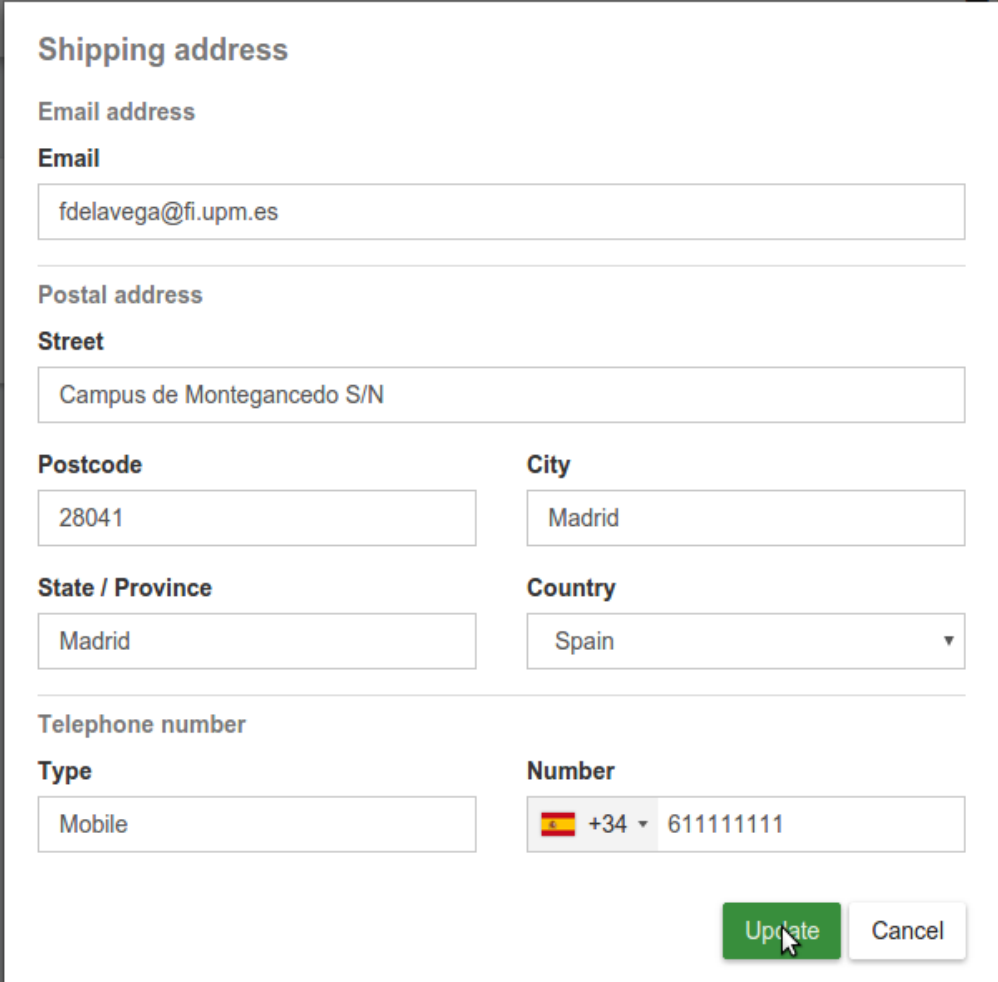
My shipping addresses

Email address	Postal address	Telephone number	Actions
fdelavega@fi.upm.es	Campus de Montegancedo S/N 28041 Madrid (Madrid) Spain	Mobile, +34611111111	

New shipping address

Email address

Email



Shipping address

Email address

Email

fdelavega@fi.upm.es

Postal address

Street

Campus de Montegancedo S/N

Postcode

28041

City

Madrid

State / Province

Madrid

Country

Spain ▼

Telephone number

Type

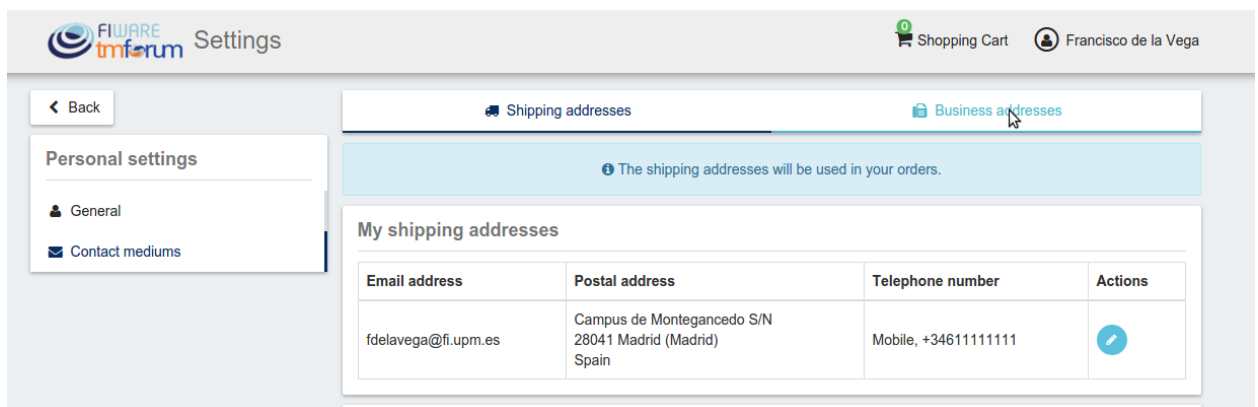
Mobile

Number

+34 611111111

Update **Cancel**

On the other hand, if you have the *Seller* role you can create *Business Addresses*, which can be used by your customers in order to allow them to contact you.



Settings

Shopping Cart Francisco de la Vega

Back

Personal settings

- General
- Contact mediums

Shipping addresses Business addresses

The shipping addresses will be used in your orders.

My shipping addresses

Email address	Postal address	Telephone number	Actions
fdelavega@fi.upm.es	Campus de Montegancedo S/N 28041 Madrid (Madrid) Spain	Mobile, +34611111111	

In the *Business Addresses* tab you can create, different kind of contact mediums, including emails, phones, and addresses. To create a contact medium, fill in the fields and click on *Create*

Settings

Shopping Cart
 Francisco de la Vega

[< Back](#)

Shipping addresses
Business addresses

ⓘ This information is public so it may be viewed by anyone.

New business address

Medium

Email

Create

Settings

Shopping Cart
 Francisco de la Vega

[< Back](#)

Shipping addresses
Business addresses

ⓘ This information is public so it may be viewed by anyone.

My business addresses

Medium	Details	Actions
Email address	fdelavega.provider@fi.upm.es	

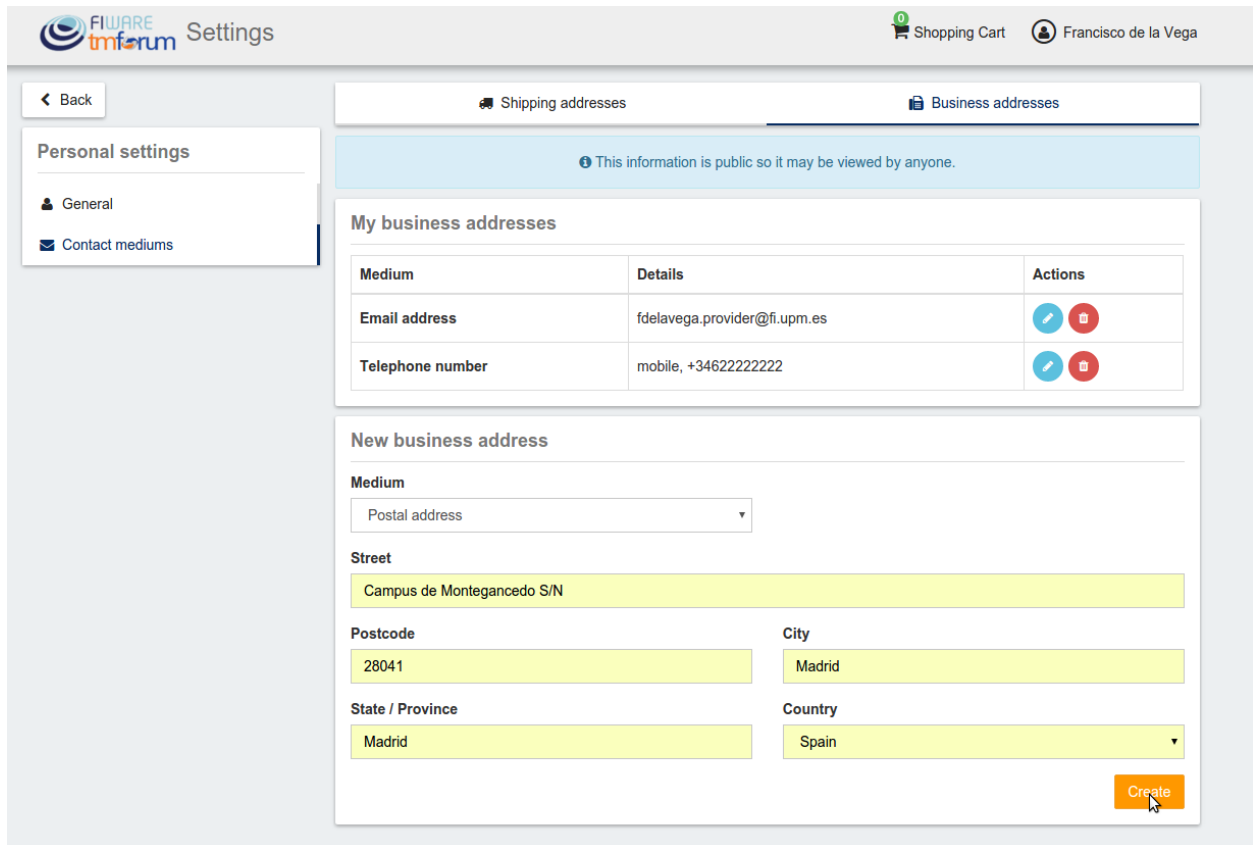
New business address

Medium

Type

Number

Create



Settings

Shopping Cart Francisco de la Vega

Back





Personal settings

- General
- Contact mediums

Shipping addresses Business addresses

This information is public so it may be viewed by anyone.

My business addresses

Medium	Details	Actions
Email address	fdelavega.provider@fi.upm.es	 
Telephone number	mobile, +34622222222	 

New business address

Medium

Postal address

Street

Campus de Montegancedo S/N

Postcode

28041

City

Madrid

State / Province

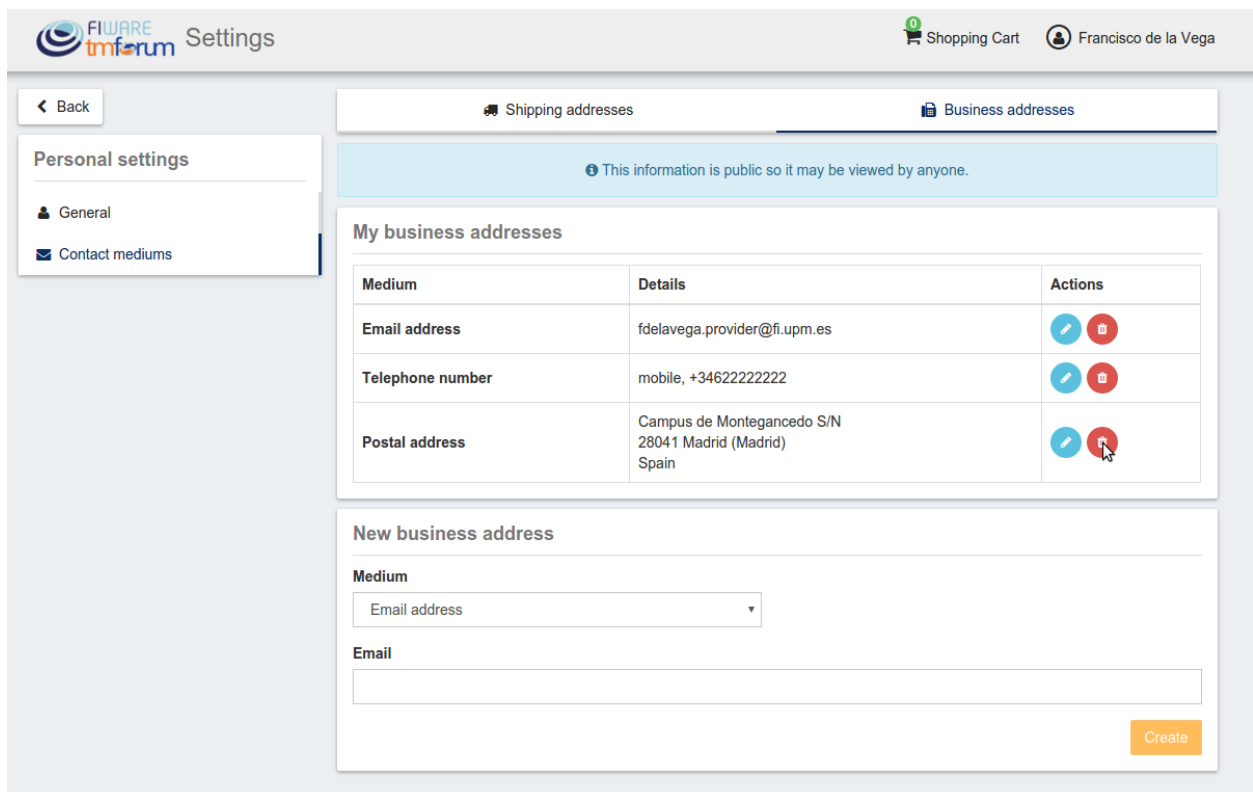
Madrid

Country

Spain

Create

You can *Edit* or *Remove* the contact medium by clicking on the corresponding button



Settings

Shopping Cart Francisco de la Vega

Back







Personal settings

- General
- Contact mediums

Shipping addresses Business addresses

This information is public so it may be viewed by anyone.

My business addresses

Medium	Details	Actions
Email address	fdelavega.provider@fi.upm.es	 
Telephone number	mobile, +34622222222	 
Postal address	Campus de Montegancedo S/N 28041 Madrid (Madrid) Spain	 

New business address

Medium

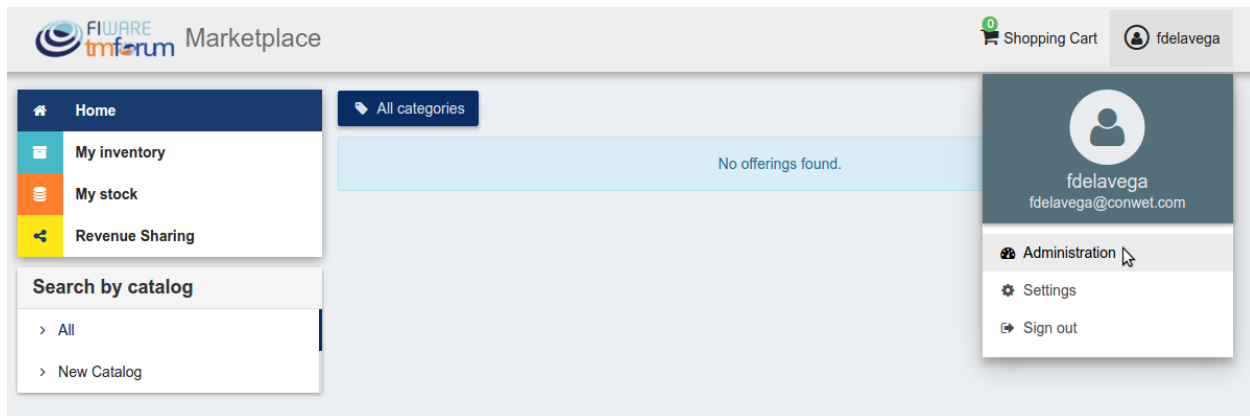
Email address

Email

Create

1.4.3 Admin

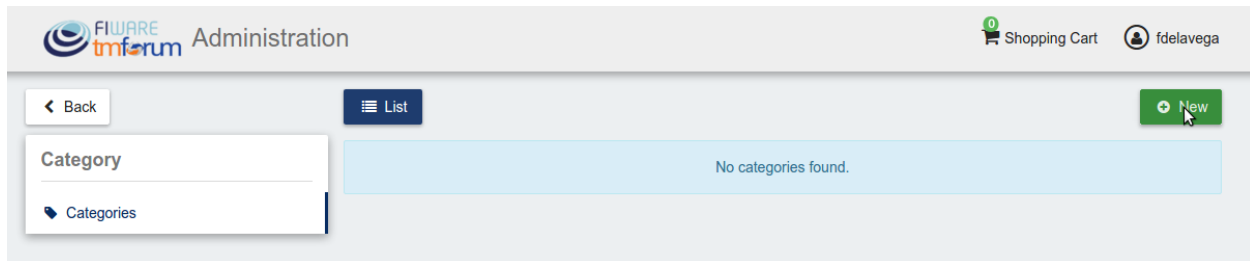
If the user of the Business API Ecosystem is an admin, he will be able to access the *Administration* section of the web portal. This section is located in the user menu.



Manage Categories

Admin users are authorized to create the system categories that can be used by *Sellers* to categorize their catalogs, products, and offerings.

To create categories, go to the *Administration* section, and click on *New*



Then, provide a name and an optional description for the category. Once the information has been included, click on *Next*, and then on *Create*

The image displays two screenshots of the FIWARE Administration interface, specifically the 'New Category' form.

Top Screenshot (Step 1: General):

- Header:** FIWARE Administration, Shopping Cart (0), fdelavega.
- Left Sidebar:** Category, Categories.
- Form Title:** New Category.
- Steps:** 1 General (selected), 2 Finish.
- Step 1: General:**
 - Enter a name:** Cloud Services
 - Enter a description (optional):** Cloud services category
 - Choose a parent category:** (toggle switch)
 - Next** button.

Bottom Screenshot (Step 2: Finish):

- Header:** FIWARE Administration, Shopping Cart (0), fdelavega.
- Left Sidebar:** Category, Categories.
- Form Title:** New Category.
- Steps:** 1 General, 2 Finish (selected).
- Step 2: Finish:**
 - Name:** Cloud Services
 - Status:** Active, Launched (selected), Retired, Obsolete.
 - Description:** Cloud services category
 - Create** button.

Categories in the Business API Ecosystem can be nested, so you can choose a parent category if you want while creating.

The screenshot shows the 'New Category' form in the FIWARE tmforum Administration interface. The form is titled 'New Category' and has two steps: '1 General' and '2 Finish'. The '1 General' step is active. It contains the following fields:

- Enter a name:** A text input field containing 'VM Services'.
- Enter a description (optional):** A text input field containing 'VM Services category'.
- Choose a parent category:** A toggle switch is turned on. Below it is a table with two columns: 'Name' and 'Updated'.

Name	Updated
Cloud Services	a minute ago

At the bottom right of the form is a 'Next' button.

Existing categories can be updated. To edit a category click on the category name.

The screenshot shows the 'List' view of categories in the FIWARE tmforum Administration interface. It displays a table with three columns: 'Status', 'Name', and 'Updated'.

Status	Name	Updated
● Launched	Cloud Services	a minute ago
● Launched	Cloud Services / VM Services	a few seconds ago

Then edit the corresponding fields and click on *Update*.

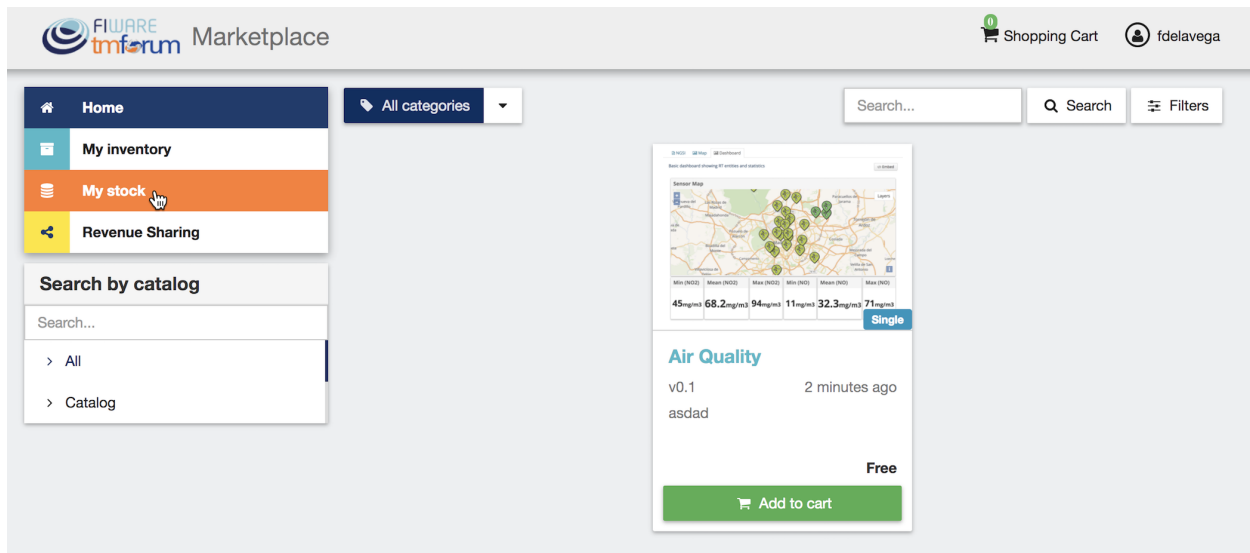
The screenshot shows the 'Detail' view of a category in the FIWARE tmforum Administration interface. The form is titled 'General' and contains the following fields:

- Name:** A text input field containing 'VM Services'.
- Status:** A horizontal radio button selector with four options: 'Active', 'Launched', 'Retired', and 'Obsolete'. The 'Launched' option is selected.
- Description (optional):** A text input field containing 'VM Services category'.

At the bottom right of the form is an 'Update' button.

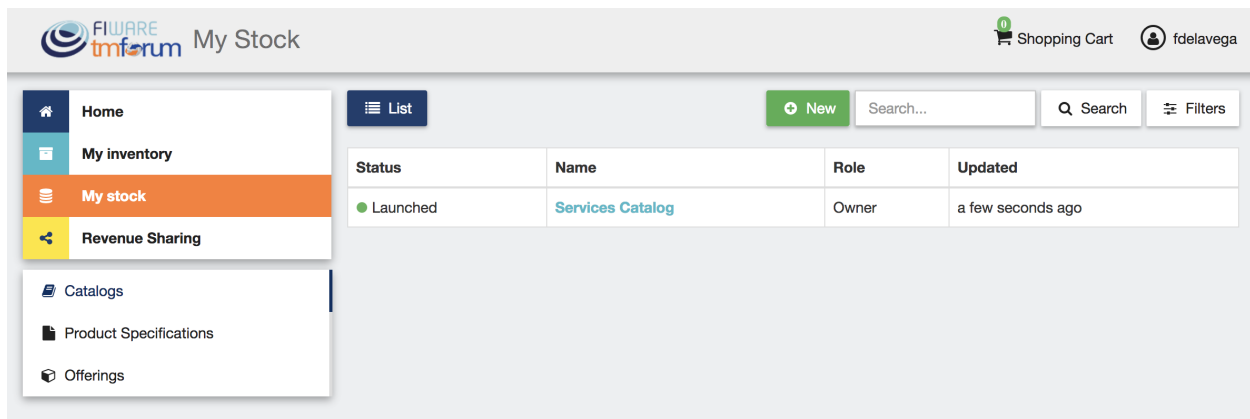
1.4.4 Seller

If the user of the Business API Ecosystem has the *Seller* role, he will be able to monetize his products by creating, catalogs, product specifications and product offerings. All these objects are managed accessing *My Stock* section.

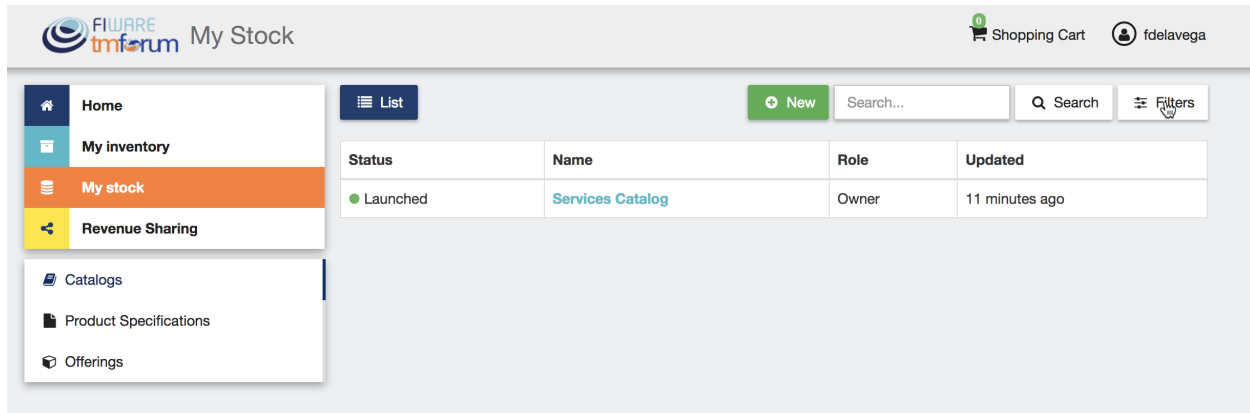


Manage Catalogs

The *Catalogs* section is the one that is open by default when the seller accesses *My Stock* section. This section contains the catalogs the seller has created.

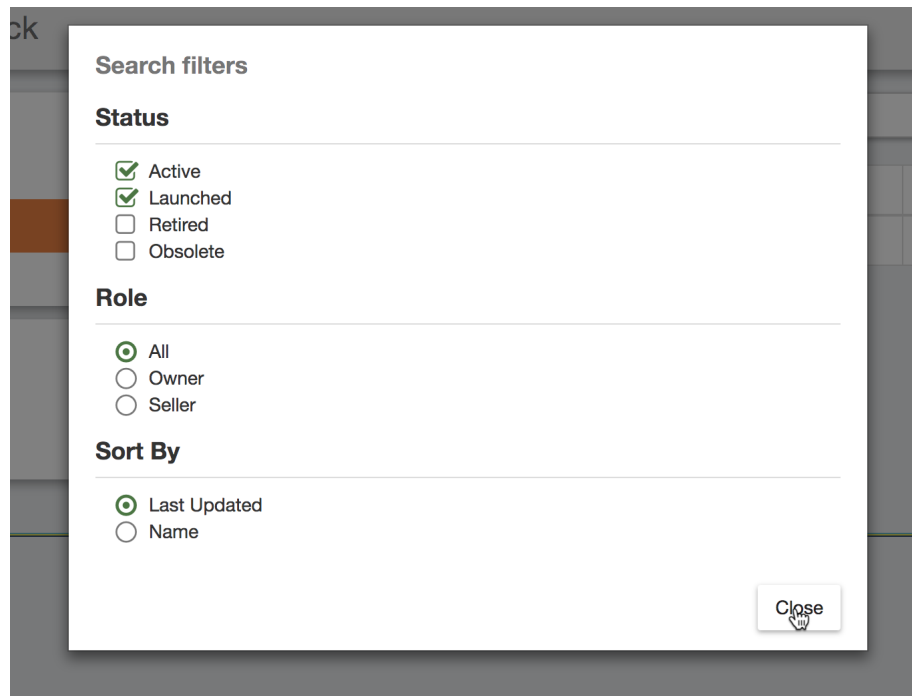


Additionally, it has been defined several mechanisms for searching and filtering the list of catalogs displayed. On the one hand, it is possible to search catalogs by keyword using the search input provided in the menu bar. On the other hand, it is possible to specify how catalog list should be sorted or filter the shown catalogs by status and the role you are playing. To do that, click on *Filters*, choose the required parameters, and click on *Close*.



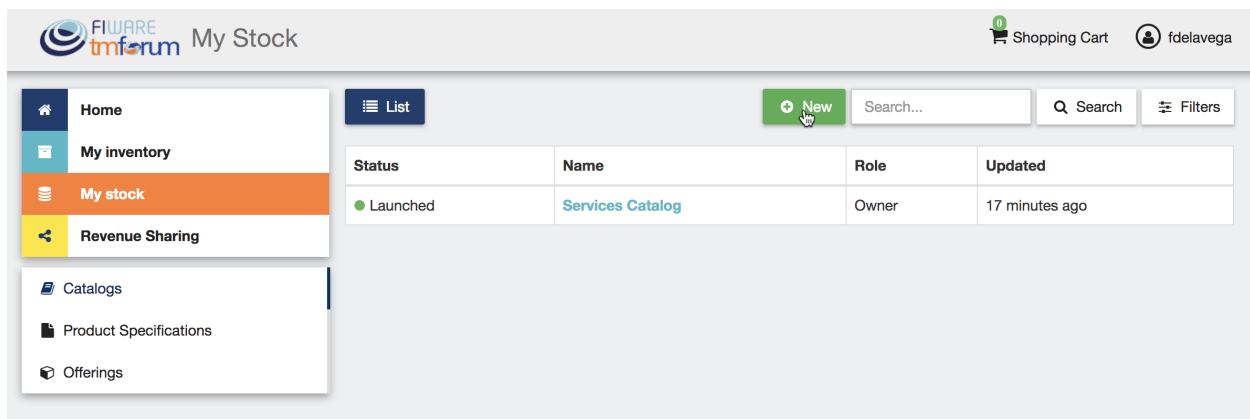
The screenshot shows the FIWARE Inform My Stock interface. On the left is a sidebar with navigation links: Home, My inventory, My stock (highlighted), Revenue Sharing, Catalogs, Product Specifications, and Offerings. The main area displays a table of catalogs. Above the table are buttons for 'List', 'New', a search bar, and a 'Filters' button. The table has columns for Status, Name, Role, and Updated.

Status	Name	Role	Updated
● Launched	Services Catalog	Owner	11 minutes ago



The screenshot shows a 'Search filters' modal dialog. It contains three sections: 'Status' with checkboxes for Active, Launched, Retired, and Obsolete; 'Role' with radio buttons for All, Owner, and Seller; and 'Sort By' with radio buttons for Last Updated and Name. A 'Close' button is in the bottom right corner.

To create a new catalog click on the *New* button.



This screenshot is similar to the first one, but the 'New' button in the top right of the main area is highlighted with a mouse cursor, indicating the next step in the process.

Then, provide a name and an optional description for the catalog. Once you have filled the fields, click on *Next*, and then on *Create*

FIWARE **My Stock** Shopping Cart fdelavega

Home My inventory **My stock** Revenue Sharing Catalogs Product Specifications Offerings

List New

New catalog

1 General 2 Finish

Step 1: General

Enter a name
Widgets Catalog

Enter a description (optional)
A catalog for selling widgets

Next

FIWARE **My Stock** Shopping Cart fdelavega

Home My inventory My stock Revenue Sharing Catalogs Product Specifications Offerings

List New

New catalog

1 General 2 Finish

Step 2: Finish

Name
Widgets Catalog

Status
Active Launched Retired Obsolete

Description
A catalog for selling widgets

Create

Sellers can also update their catalogs. To do that, click on the name of the catalog to open the update view.

FIWARE **My Stock** Shopping Cart fdelavega

List New Search... Search Filters

Status	Name	Role	Updated
Launched	Services Catalog	Owner	27 minutes ago
Active	Widgets Catalog	Owner	6 minutes ago

Then, update the fields you want to modify and click on *Update*. In this view, it is possible to change the *Status* of the catalog. To start monetizing the catalog, and make it appear in the *Home* you have to change its status to *Launched*

The screenshot shows the 'My Stock' interface with a sidebar menu on the left containing: Home, My inventory, My stock (highlighted), Revenue Sharing, Catalogs, Product Specifications, and Offerings. The main content area is titled 'Widgets Catalog' and has tabs for 'About', 'Parties', and 'Offerings'. The 'About' tab is active, showing a 'General' section with a 'Name' field containing 'Widgets Catalog', a 'Status' section with a progress bar showing 'Active', 'Launched' (selected), 'Retired', and 'Obsolete', and a 'Description (optional)' field containing 'A catalog for selling widgets'. An 'Update' button is at the bottom right.

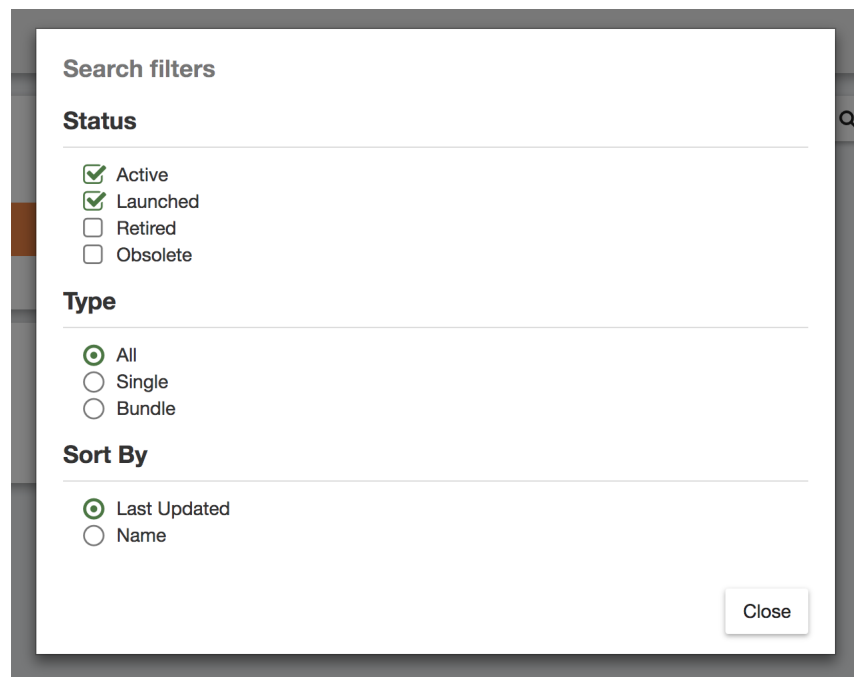
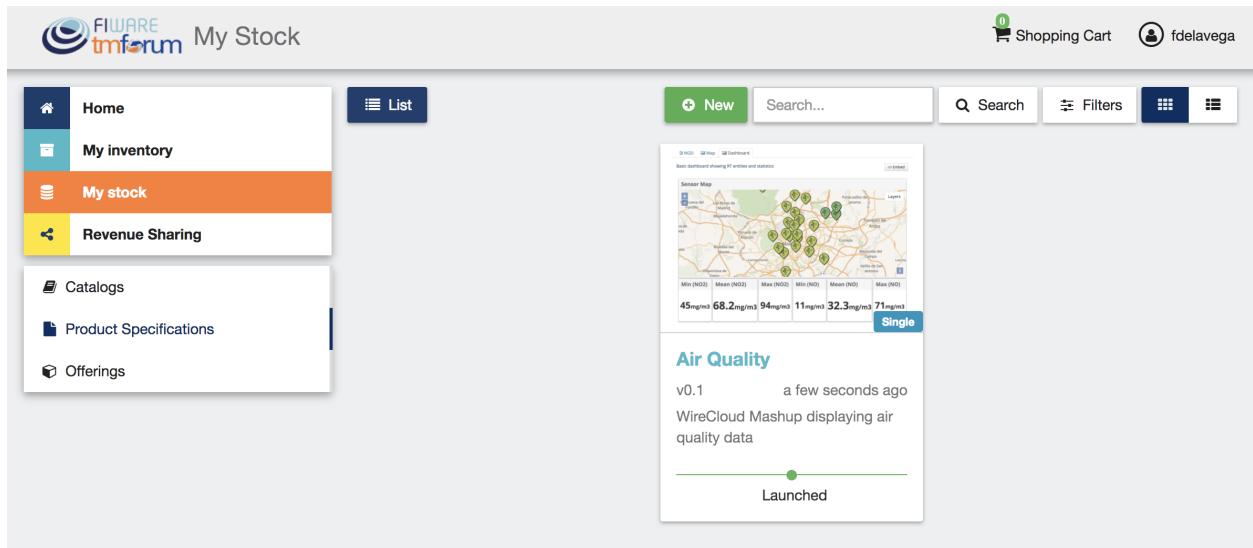
Manage Product Specifications

Product Specifications represent the product being offered, both digital and physical. To list your product specifications go to *My Stock* section and click on *Product Specifications*

The screenshot shows the 'My Stock' interface with the sidebar menu on the left. The main content area is titled 'Product Specifications' and has a 'List' tab. Above the table are buttons for '+ New', a search bar, and a 'Filters' button. The table has columns: Status, Name, Role, and Updated.

Status	Name	Role	Updated
Launched	Services Catalog	Owner	2 hours ago
Active	Widgets Catalog	Owner	an hour ago

In the same way as catalogs, product specifications can be searched by keyword, sorted, or filtered by status and whether they are bundles or not. To filter or sort product specifications, click on *Filters*, choose the appropriate properties, and click on *Close*



Additionally, it is possible to switch between the grid view and the tabular view using the provided buttons.

The screenshot shows the FIWARE My Stock dashboard. On the left is a sidebar with navigation links: Home, My inventory, My stock (highlighted), Revenue Sharing, Catalogs, Product Specifications, and Offerings. The main area displays a map with green dots representing air quality data points. Below the map, a detailed view of the 'Air Quality' product is shown, including its version (v0.1), update time (2 minutes ago), and a 'Launched' status indicator.

This screenshot shows the same dashboard but with the product specifications displayed in a table. The table has columns for Status, Name, ID, Brand, Type, and Updated. The 'Air Quality' product is listed with ID 1, brand UPM, and type Single.

Status	Name	ID	Brand	Type	Updated
Launched	Air Quality	1	UPM	Single	2 minutes ago

To create a new product specification click on *New*

This screenshot shows the dashboard with the 'New' button in the top right corner highlighted by a mouse cursor, indicating the action to create a new product specification.

In the displayed view, provide the general information of the product spec. including its name, version, and an optional description. In addition, you have to include the product brand (Your brand), and an ID number which identifies the product in your environment. Then, click on *Next*.

The screenshot shows the 'New product' form in Step 1: General. The left sidebar contains a navigation menu with 'Home', 'My inventory', 'My stock' (highlighted), 'Revenue sharing', 'Catalogs', 'Product specifications', and 'Offerings'. The main content area has a 'List' button and a 'New' button. Below the 'New' button is a list of steps: 1 General (highlighted), 2 Bundle, 3 Assets, 4 Characteristics, 5 Attachments, 6 Relationships, and 7 Finish. The 'Step 1: General' form includes fields for 'Enter a name' (Basic Chart), 'Enter a version' (0.1), 'Enter a brand' (UPM), and 'Enter an ID Number' (1234). There is also a text area for 'Enter a description (optional)' with the text 'A basic widget for showing charts'. A 'Next' button is at the bottom right.

In the next step, you can choose whether your product specification is a bundle or not. Product bundles are logical containers that allow you to sell multiple products as if it were a single one. Once you have selected the right option click on *Next*

The screenshot shows the 'New product' form in Step 2: Bundle. The left sidebar is the same as in Step 1. The main content area has a 'List' button and a 'New' button. Below the 'New' button is a list of steps: 1 General, 2 Bundle (highlighted), 3 Assets, 4 Characteristics, 5 Attachments, 6 Relationships, and 7 Finish. The 'Step 2: Bundle' form includes a question 'Is a new bundle of products?' with a toggle switch. A 'Next' button is at the bottom right.

If you have decided to create a bundle, you will be required to choose 2 or more product specs to be included in the bundle.

New product

1 General

2 Bundle

3 Assets

4 Characteristics

5 Attachments

6 Relationships

7 Finish

Step 2: Bundle

Is a new bundle of products? ☒

Search...

Status	Name	ID	Brand	Type	Last Updated
Launched	terms	asdad	asd	Single	2 hours ago
Launched	digital4	asdad	asdad	Single	a month ago
Launched	digital3	a	asda	Single	a month ago
Launched	digital2	asda	asd	Single	a month ago
Launched	digital1	asd	asd	Single	a month ago
Launched	Nondigital	1	UPM	Single	a month ago

Next

In the next step you can choose if your product is a digital product. If this is the case, you will be required to provide the asset.

Note: If you are creating a product bundle, you will not be allowed to provide a digital asset since the offered ones will be the included in the bundled products

For providing the asset, you have to choose between the available asset types, choose how to provide the asset between the available options, provide the asset, and include its media type.

New product

1 General

2 Bundle

3 Assets

4 Characteristics

5 Attachments

6 Relationships

7 Terms & Conditions

8 Finish

Step 3: Assets

Is a digital product? ☒

Digital Asset Type: WireCloud Component

How to provide?: URL

Asset URL: https://myserver.com/chart.wgt

Media Type: widget

Next

The next step in the creation of a product is including its characteristics. For including a new characteristic click on *New Characteristic*

In the form, include the name, the type (string or number) and an optional description. Then create the values of the characteristic by filling the *Create a value* input and clicking on +.

FIWARE My Stock

Shopping Cart fdelavega

Home My inventory My stock Revenue Sharing Catalogs Product Specifications Offerings

List New

New product

1 General 2 Bundle 3 Assets 4 Characteristics 5 Attachments 6 Relationships 7 Terms & Conditions 8 Finish

Step 4: Characteristics

No characteristic included.

Enter a name Charts

Choose a type Number

Enter a description (optional) Number of charts included within the widget

Values

Value	Unit	Action
Default 5 charts		

Create a value

10 Unit charts

Create

Next

Once you have included all the characteristic info, save it clicking on *Create*

FIWARE My Stock

Shopping Cart fdelavega

Home My inventory My stock Revenue Sharing Catalogs Product Specifications Offerings

List New

New product

1 General 2 Bundle 3 Assets 4 Characteristics 5 Attachments 6 Relationships 7 Terms & Conditions 8 Finish

Step 4: Characteristics

No characteristic included.

Enter a name Charts

Choose a type Number

Enter a description (optional) Number of charts included within the widget

Values

Value	Unit	Action
Default 5 charts		
Default 10 charts		

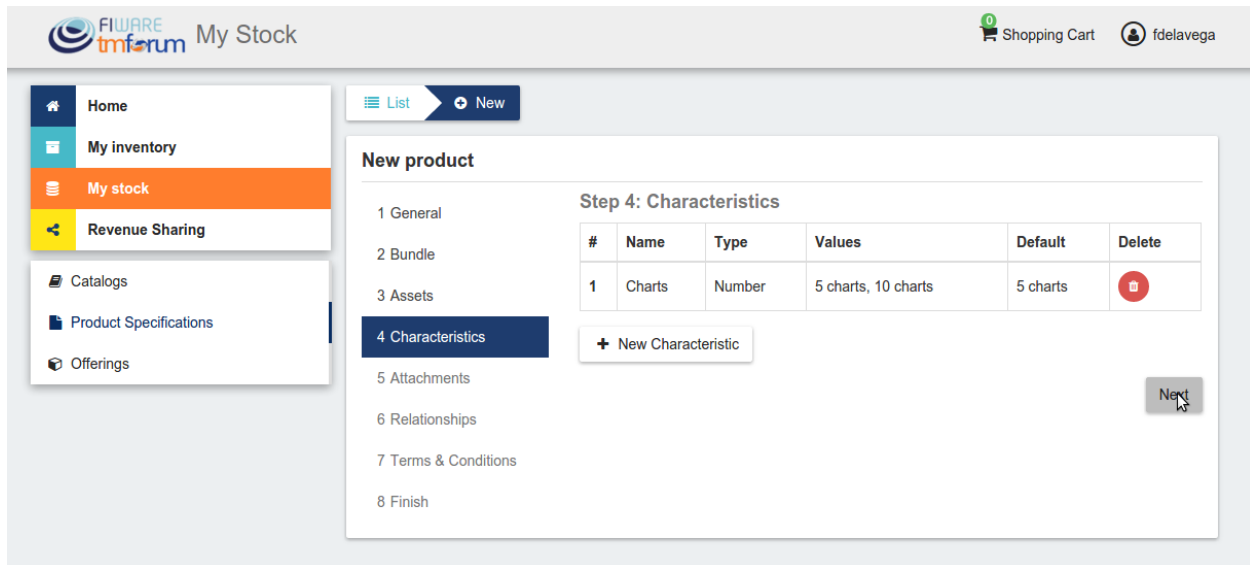
Create a value

Unit

Create

Next

Once you have included all the required characteristics click on *Next*



FIWARE My Stock Shopping Cart fdelavega

New product

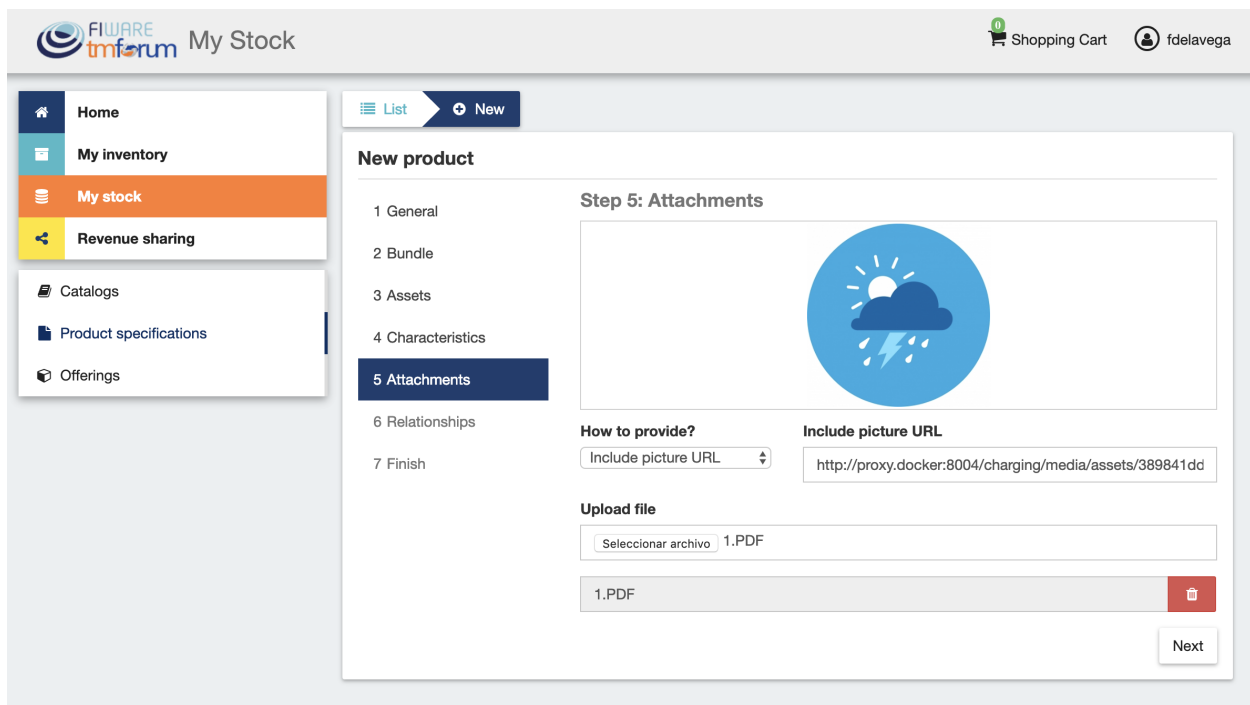
Step 4: Characteristics

#	Name	Type	Values	Default	Delete
1	Charts	Number	5 charts, 10 charts	5 charts	

+ New Characteristic

Next

In the next step you can include a picture for your product spec. You have two options, providing an URL pointing to the picture or directly uploading it. In addition, it is possible to include multiple file attachments to the product spec, such as images, PDF documentation, etc. Once provided click *Next*



FIWARE My Stock Shopping Cart fdelavega

New product

Step 5: Attachments

How to provide?

Include picture URL

Upload file

Seleccionar archivo 1.PDF

1.PDF

Next

FIWARE **My Stock** Shopping Cart fdelavega

Home My inventory **My stock** Revenue sharing Catalogs Product specifications Offerings

List New

New product

- General
- Bundle
- Assets
- Characteristics
- Attachments**
- Relationships
- Finish

Step 5: Attachments

How to provide?
 Upload picture

Upload picture
 Seleccionar archivo weather.jpg

Upload file
 Seleccionar archivo 1.PDF

1.PDF

Next

In the last step, you can specify relationships of the product you are creating with other of your product specs.

FIWARE **My Stock** Shopping Cart fdelavega

Home My inventory My stock Revenue Sharing Catalogs Product Specifications Offerings

List New

New product

- General
- Bundle
- Assets
- Characteristics
- Attachments
- Relationships**
- Terms & Conditions
- Finish

Step 6: Relationships

No relationships included.

New relationship

Choose a relationship
 Migration

Choose a product specification

Name	Type	Updated
------	------	---------

Create

Next

Once done click on *Next* and then on *Create*

The screenshot shows the 'My Stock' application interface. On the left is a sidebar menu with options: Home, My inventory, My stock (highlighted), Revenue sharing, Catalogs, Product specifications, and Offerings. The main content area is titled 'New product' and shows 'Step 7: Finish'. A list of steps (1-7) is on the left, with '7 Finish' selected. The form fields include: Name (Basic Chart), Version (0.1), Status (Active, Launched, Retired, Obsolete), Brand (UPM), ID Number (1234), Description (A widget for showing basic charts), and Cover image (Picture URL: http://proxy.docker:8004/charging/media/assets/389841dd-2524-4e21-b52b-ba7d49db38c6). A 'Create' button is at the bottom right.

Sellers can update their products. To do that click on the product specification to be updated.


The screenshot shows the 'My Stock' application interface with a list of products. The sidebar menu is the same as in the previous screenshot. The main content area has a 'List' button and a 'New' button. Below these are two product cards. The first card is for 'Map Viewer' (v0.1, a few seconds ago, Map Viewer WireCloud Widget, Active status). The second card is for 'Air Quality' (v0.1, 29 minutes ago, WireCloud Mashup displaying air quality data, Launched status). Both cards have a 'Single' button in the top right corner.



Update the required values and click on *Update*. Note that for start selling an offering that includes the product specification you will be required to change its status to *Launched*

The screenshot shows the 'My Stock' interface in the FIWARE tmforum. The left sidebar contains navigation links: Home, My inventory, My stock (highlighted), Revenue Sharing, Catalogs, Product Specifications, and Offerings. The main content area displays the 'Map Viewer' product details. At the top, there's a 'Wirecloud WC' logo and a 'Map Viewer' title. Below the title are tabs for 'About', 'Characteristics', 'Attachments', and 'Relationships'. The 'About' tab is active, showing a 'General' section with fields for 'Name' (Map Viewer), 'Version' (0.1), 'Status' (Active), 'Brand' (UPM), 'ID Number' (1), and 'Description' (optional) (Map Viewer WireCloud Widget). There are 'Upgrade' and 'Update' buttons at the bottom right of the form.

Note: For digital products it is not allowed to update the version using this form. Instead it is required to follow the process for upgrading the product version.

The basic information of the product specification is not the only information that can be updated, but it is also possible to update the *Attachments* and the *Relationships* by clicking of the related tab.


My Stock

 Shopping Cart
  fdelavega

Home

My inventory

My stock

Revenue Sharing


Catalogs

Product Specifications

Offerings

List

Details



Map Viewer

Upgrade

About


Characteristics

Attachments

Relationships

Attachments

Picture



How to provide?

Include picture URL

Include picture URL

https://catalogue.fiware.org/sites/default/files/styles/enabler_icon_large/public/fiware-160x160.png

Update

The screenshot displays the FIWARE My Stock web application. The top navigation bar includes the FIWARE logo, the text 'My Stock', a shopping cart icon with '0' items, and a user profile icon for 'fdelavega'. A left sidebar contains a menu with 'My inventory', 'My stock' (highlighted in orange), 'Revenue Sharing', 'Catalogs', 'Product Specifications', and 'Offerings'. The main content area features a 'Map Viewer' section with a 'Wirecloud' logo and an 'Upgrade' button. Below this is a 'Relationships' section with a message 'No relationships included.' and a 'New relationship' form. The form includes a 'Choose a relationship' dropdown set to 'Migration', a 'Choose a product specification' search bar, and a table with one entry: 'Air Quality' with type 'Single' and updated '33 minutes ago'. A 'Create' button is at the bottom right of the form.

My Stock

Shopping Cart 0 fdelavega

My inventory

My stock

Revenue Sharing

Catalogs

Product Specifications

Offerings

Wirecloud

Map Viewer

Upgrade

About Characteristics Attachments Relationships

Relationships

No relationships included.

New relationship

Choose a relationship

Migration

Choose a product specification

Search... Search

Name	Type	Updated
Air Quality	Single	33 minutes ago

Create

The displayed details form can be used for digital products specifications in order to provide new versions of the digital assets being offered. This can be done by clicking on *Upgrade*.

The screenshot shows the 'My Stock' interface. On the left is a sidebar with navigation links: Home, My inventory, My stock (highlighted), Revenue Sharing, Catalogs, Product Specifications, and Offerings. The main area displays the 'Map Viewer' product details. At the top, there's a 'Wirecloud' logo and a 'Map Viewer' title. A green 'Upgrade' button is in the top right. Below the title are tabs: About, Characteristics, Attachments, and Relationships. The 'General' section contains the following fields:

- Name:** Map Viewer
- Version:** 0.1
- Status:** Active (indicated by a blue dot on a timeline)
- Brand:** UPM
- ID Number:** 1

In the displayed form, it is required to include a new version for the product specification and to provide the new digital asset to be offered.

The 'Upgrade Product Spec' dialog box contains the following fields and options:

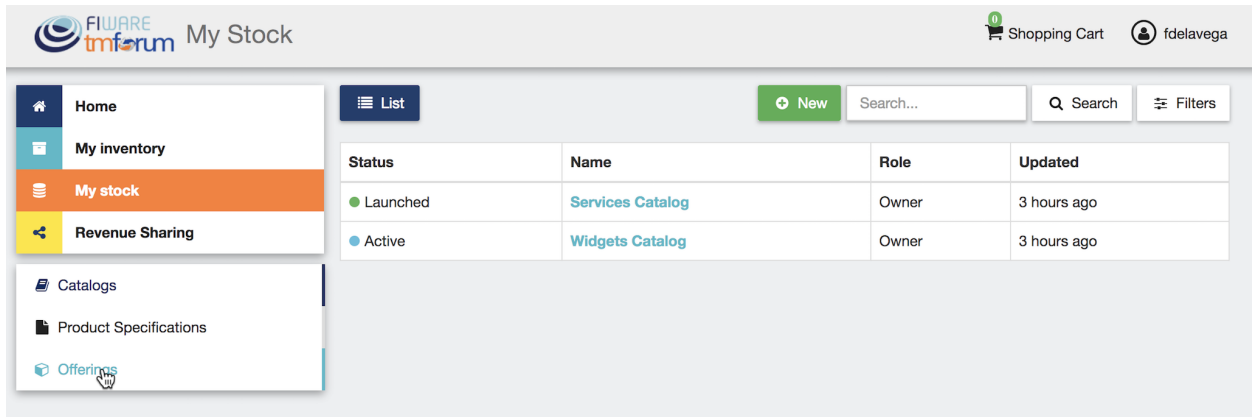
- New Version:** 0.2
- Digital Asset Type:** WireCloud Component
- How to provide?:** FILE
- Asset File:** Seleccionar archivo CoNWeT_ol3-map_1.0.1rc2.wgt
- Media Type:** widget

At the bottom right, there are two buttons: 'Upgrade' (green) and 'Cancel' (white).

Note: All the customers who have acquired an offering including the current product specification will be able to access to the new version of the digital asset.

Manage Product Offerings

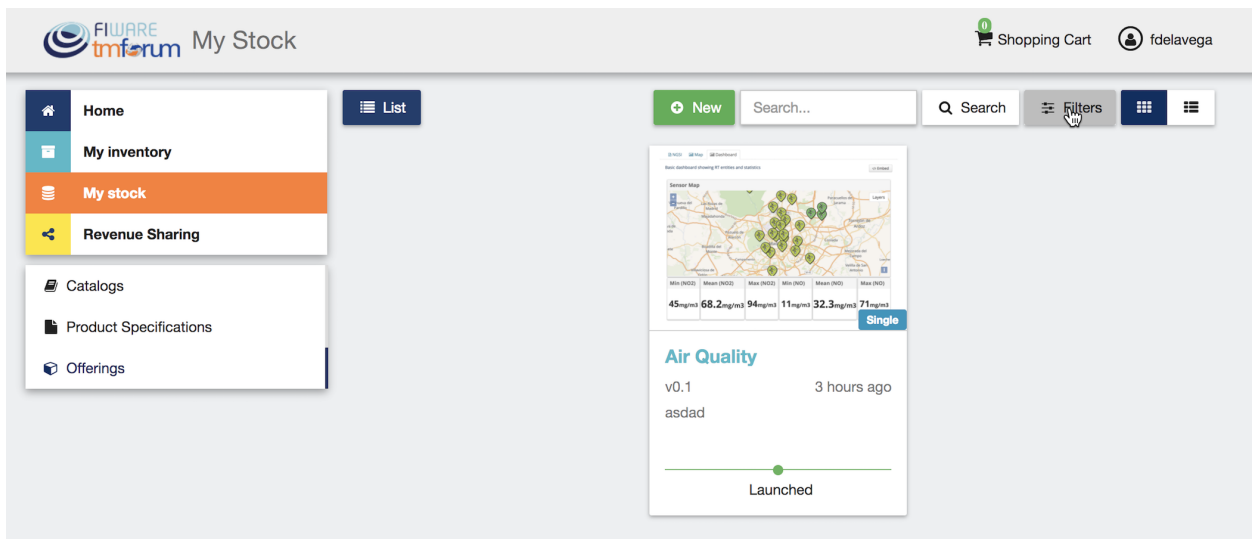
Product Offerings are the entities that contain the pricing models and revenue sharing info used to monetize a product specification. To list your product offerings, go to *My Stock* section and click on *Offerings*



The screenshot shows the 'My Stock' interface with the 'Offerings' menu item selected in the left sidebar. The main content area displays a table of product offerings.

Status	Name	Role	Updated
● Launched	Services Catalog	Owner	3 hours ago
● Active	Widgets Catalog	Owner	3 hours ago

The existing product offerings can be searched by keyword, sorted, or filtered by status and whether they are bundles or not. To filter or sort product offerings, click on *Filters*, choose the appropriate properties, and click on *Close*

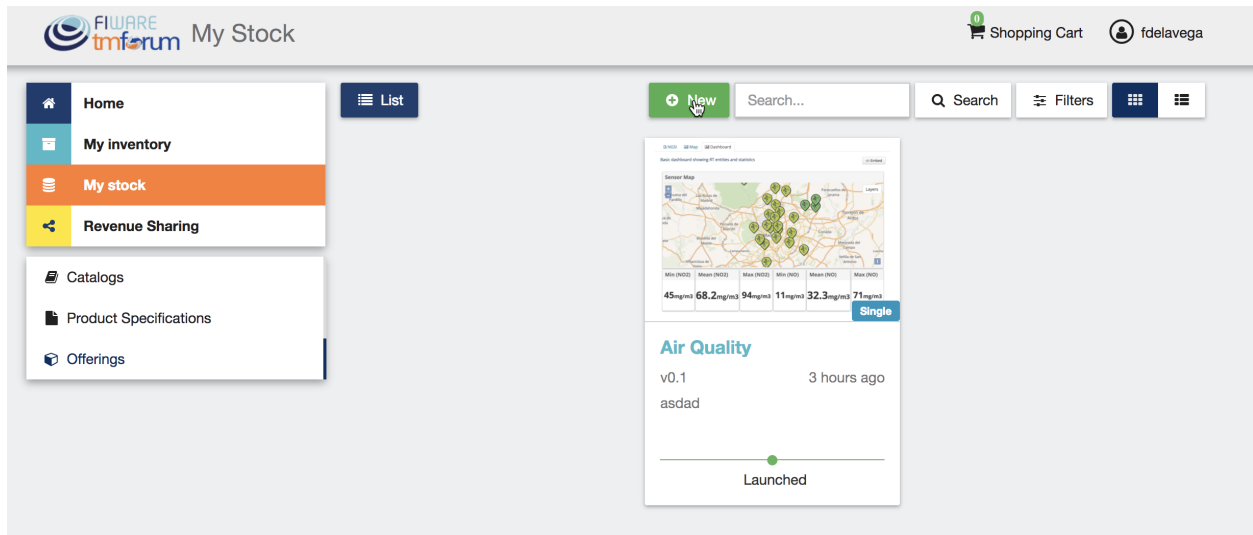


The screenshot shows the 'My Stock' interface with the 'Filters' dialog box open. The dialog box displays a map of sensor locations and a table of sensor data.

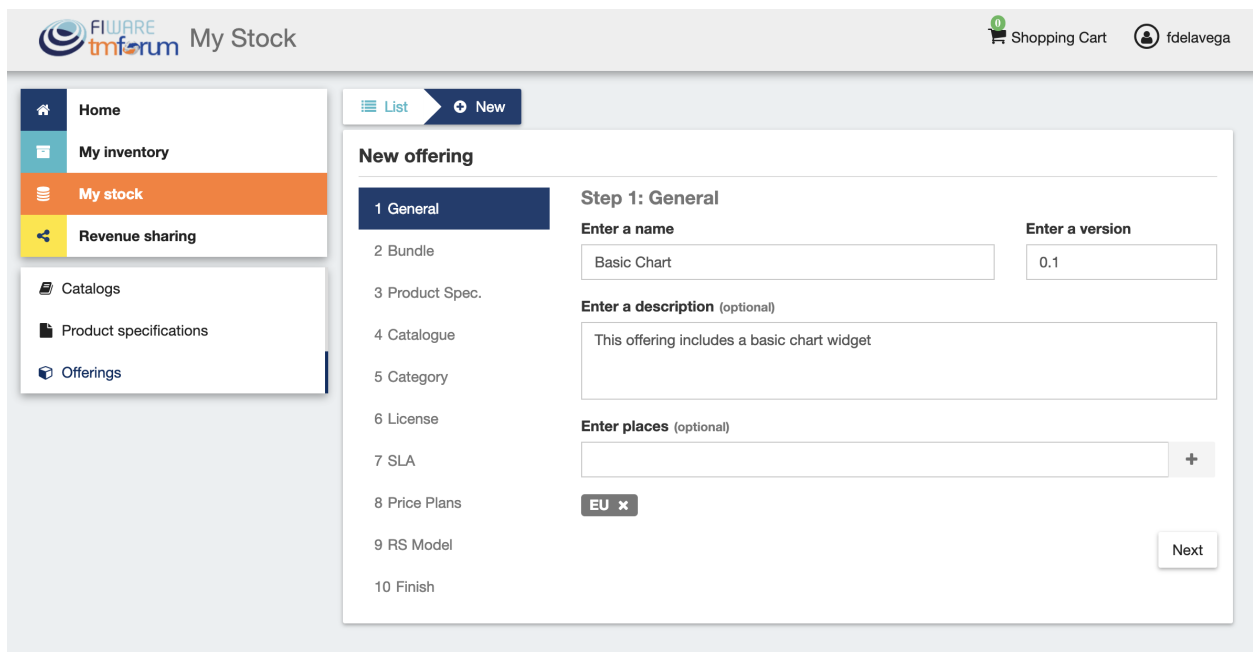
Max (2020)	Mean (2020)	Min (2020)	Max (2021)	Mean (2021)	Min (2021)
45mg/m3	68.2mg/m3	94mg/m3	11mg/m3	32.3mg/m3	71mg/m3

The dialog box also includes a 'Single' button and a 'Launched' status indicator.

To create a new offering click on *New*



In the displayed form, include the basic info of the offering. Including, its name, version, an optional description, and an optional set of places where the offering is available. Once the information has been provided click on *Next*



In the next step, you can choose whether your offering is a bundle or not. In this case, offering bundles are logical containers that allow you to provide new pricing models when a set of offerings are acquired together. Once selected click on *Next*

FIWARE My Stock

Shopping Cart fdelavega

Home My inventory My stock Revenue Sharing Catalogs Product Specifications Offerings

List New

New offering

1 General 2 Bundle 3 Product Spec. 4 Catalogue 5 Category 6 Price Plans 7 RS Model 8 Finish

Step 2: Bundle

Is a new bundle of offerings?

Next

If you want to create a bundle you will be required to include at least two bundled offerings.

FIWARE My Stock

Shopping Cart fdelavega

Home My inventory My stock Revenue Sharing Catalogs Product Specifications Offerings

List New

New offering

1 General 2 Bundle 3 Product Spec. 4 Catalogue 5 Category 6 Price Plans 7 RS Model 8 Finish

Step 2: Bundle

Is a new bundle of offerings?

Status	Name	Type	Updated
Active	Map Viewer	Single	42 minutes ago
Launched	Basic Chart	Single	a few seconds ago

Next

In the next step you have to select the product specification that is going to be monetized in the current offering. Once selected click on *Next*.

The screenshot shows the FIWARE My Stock interface. The left sidebar contains a navigation menu with options: Home, My inventory, My stock (highlighted), Revenue Sharing, Catalogs, Product Specifications, and Offerings. The main content area is titled 'New offering' and shows 'Step 3: Product Spec.'. A list of steps is on the left, with '3 Product Spec.' selected. The main table displays two offerings:

Status	Name	ID	Brand	Type	Updated
Active	Map Viewer	1234	UPM	Single	17 hours ago
Launched	Basic Chart	1234	UPM	Single	16 hours ago

A 'Next' button is visible at the bottom right of the main content area.

Note: If you are creating an offering bundle, you will not be allowed to include a product specification

Then, you have to select the catalog where you want to publish your offering and click on *Next*

The screenshot shows the FIWARE My Stock interface. The left sidebar is the same as in the previous screenshot. The main content area is titled 'New offering' and shows 'Step 4: Catalogue'. A list of steps is on the left, with '4 Catalogue' selected. The main table displays two offerings:

Status	Name	Role	Updated
Launched	Widgets Catalog	Owner	17 hours ago
Active	Services Catalog	Owner	17 hours ago

A 'Next' button is visible at the bottom right of the main content area.

In the next step, you can optionally choose categories for your offering. Once done, click on *Next*

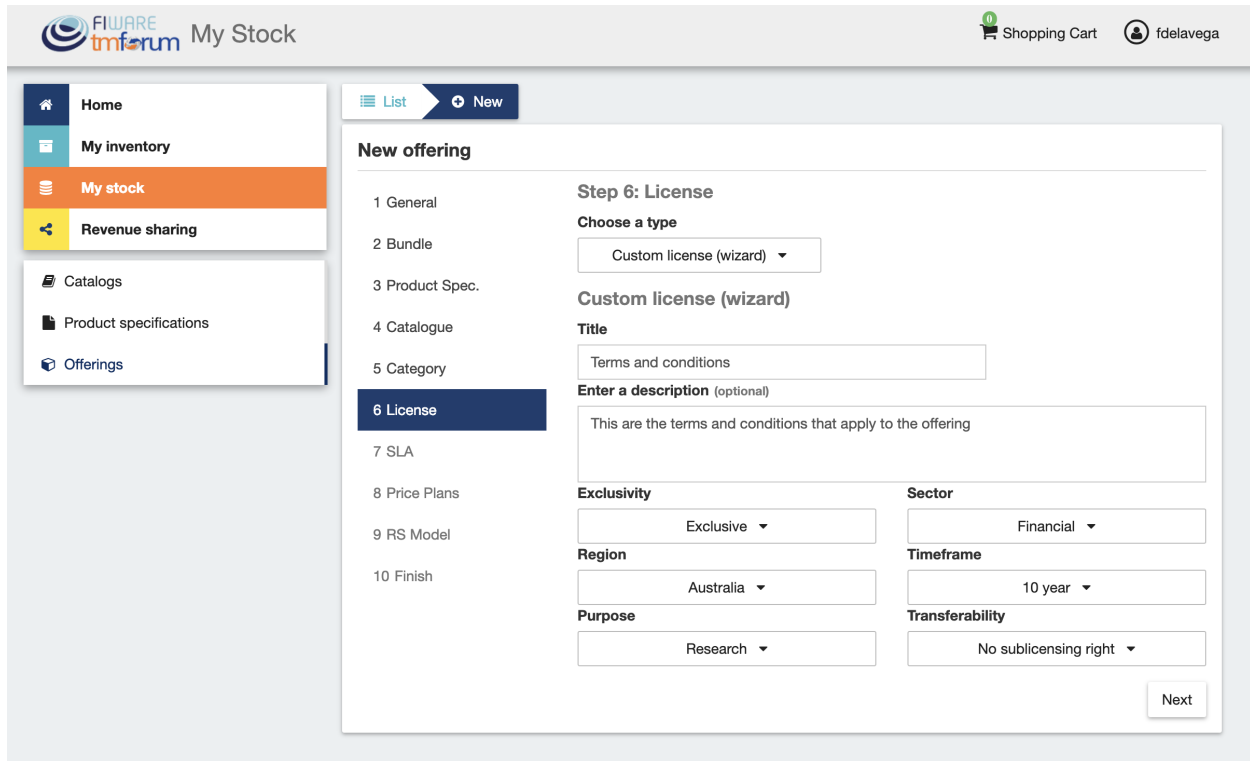
The screenshot shows the 'My Stock' interface with a sidebar menu on the left containing: Home, My inventory, My stock (highlighted), Revenue Sharing, Catalogs, Product Specifications, and Offerings. The main content area is titled 'New offering' and shows a progress list on the left with steps 1 through 8. Step 5, 'Category', is selected and highlighted. The main panel for Step 5 is titled 'Step 5: Category' and includes the sub-header 'Choose categories (optional)'. It contains a table with two columns: 'Name' and 'Updated'.

Name	Updated
Cloud Services	18 hours ago
Cloud Services / VM Services	18 hours ago

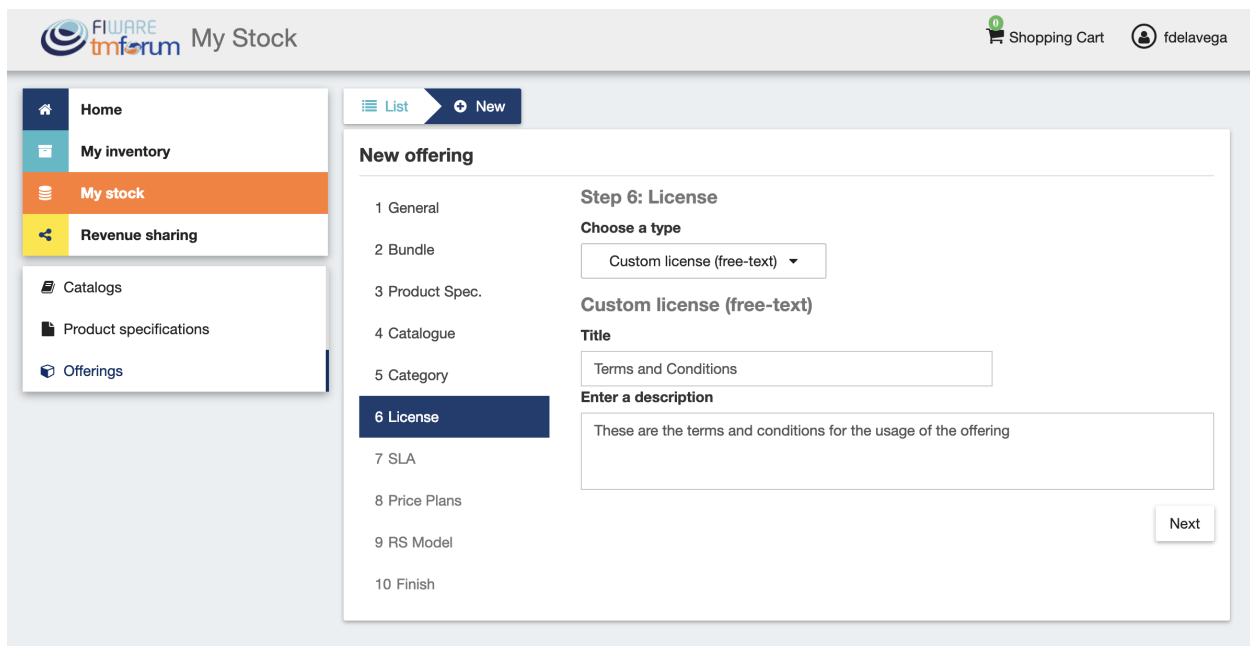
A 'Next' button is located at the bottom right of the main panel.

Next, it is possible to include the License or terms and conditions to be applied to the offering being created. There are three different options for providing such information: (1) For data, there is a set of standard open data licenses that can be chosen, (2) providing custom terms and conditions using a wizzard, and (3) providing terms and conditions providing free text.

The screenshot shows the 'My Stock' interface with the same sidebar menu. The main content area is titled 'New offering' and shows a progress list on the left with steps 1 through 10. Step 6, 'License', is selected and highlighted. The main panel for Step 6 is titled 'Step 6: License' and includes the sub-header 'Choose a type'. It contains a dropdown menu with 'Standard open data license' selected. Below this, there is a section titled 'Standard open data licenses' with a dropdown menu showing 'Attribution 4.0 International (CC BY 4.0)'. A 'Next' button is located at the bottom right of the main panel.



The screenshot shows the 'My Stock' application interface. The top navigation bar includes the 'FIWARE Inform' logo, 'My Stock' text, a shopping cart icon with '0' items, and a user profile icon labeled 'fdelavega'. The left sidebar contains a menu with 'Home', 'My inventory', 'My stock' (highlighted), 'Revenue sharing', 'Catalogs', 'Product specifications', and 'Offerings'. The main content area is titled 'New offering' and shows a progress list on the left with steps 1 through 10. Step 6, 'License', is currently selected. The form for Step 6 is titled 'Step 6: License' and includes a 'Choose a type' dropdown set to 'Custom license (wizard)'. Below this is the 'Custom license (wizard)' section with fields for 'Title' (containing 'Terms and conditions'), 'Enter a description (optional)' (containing 'This are the terms and conditions that apply to the offering'), 'Exclusivity' (dropdown set to 'Exclusive'), 'Region' (dropdown set to 'Australia'), 'Purpose' (dropdown set to 'Research'), 'Sector' (dropdown set to 'Financial'), 'Timeframe' (dropdown set to '10 year'), and 'Transferability' (dropdown set to 'No sublicensing right'). A 'Next' button is located at the bottom right of the form.



This screenshot shows the same 'My Stock' application interface, but the 'New offering' form is at Step 6: License with the 'Custom license (free-text)' type selected. The 'Choose a type' dropdown is set to 'Custom license (free-text)'. The 'Custom license (free-text)' section has a 'Title' field containing 'Terms and Conditions' and an 'Enter a description' field containing 'These are the terms and conditions for the usage of the offering'. The 'Next' button is at the bottom right.

It is possible to include some SLA information attached to the offering in the step of the form. To do that, click on *Define new metric* button. In the displayed form, choose a metric, provide its value and click on *Add metric*.

The screenshot shows the 'My Stock' interface with a sidebar menu on the left containing: Home, My inventory, My stock (highlighted), Revenue sharing, Catalogs, Product specifications, and Offerings. The main content area is titled 'New offering' and shows a progress list on the left with steps 1 through 10. Step 7, 'SLA', is currently selected. The right panel is titled 'Step 7: SLA' and contains a blue box stating 'No SLA included.' Below this is a section 'Define SLA' with a 'Choose a metric' dropdown menu set to 'RESPONSE TIME'. A text description reads: 'Total amount of time to respond to a data request (GET).' There is an input field for 'Enter guaranteed response time' with the value '500' and a unit dropdown set to 'MS'. An 'Add metric' button is present. A 'Next' button is at the bottom right.

Once all the metrics have been provided click on *Next*

This screenshot shows the same 'My Stock' interface, but the 'Define SLA' section now displays a table of metrics. The table has five columns: Type, Description, Threshold, Unit Measure, and Remove. One metric is listed: 'Response time' with a description of 'Total amount of time to respond to a data request (GET)', a threshold of '500', and a unit measure of 'ms'. A 'Remove' button (trash icon) is in the last column. Below the table is a 'Define new metric' button. The 'Next' button remains at the bottom right.

Type	Description	Threshold	Unit Measure	Remove
Response time	Total amount of time to respond to a data request (GET).	500	ms	

The next step is the most important for the offering. In the displayed form you can create different price plans for you offering, which will be selectable by customers when acquiring the offering. If you do not include any price plan the offering it is considered free.

To include a new price plan the first step is clicking on *New Price Plan*

The screenshot shows the 'New offering' wizard at Step 6: Price Plans. On the left is a sidebar with navigation links: Home, My inventory, My stock (highlighted), Revenue Sharing, Catalogs, Product Specifications, and Offerings. The main content area has a 'List' button and a 'New' button. Below them is a list of steps: 1 General, 2 Bundle, 3 Product Spec., 4 Catalogue, 5 Category, 6 Price Plans (highlighted), 7 RS Model, and 8 Finish. The main panel displays 'Step 6: Price Plans' with a message 'No price plans included.' and a 'New price plan' button. A 'Next' button is located at the bottom right.


For creating the price plan, you have to provide a name, and an optional description. Then, you have to choose the type of price plan between the provided options.



The available types are: *one time* for payments that are made once when purchasing the offering, *recurring* for charges that are made periodically (e.g a monthly payment), and *usage* for charges that are calculated applying the pricing model to the actual usage made of the acquired service.

If you choose *one time*, you have to provide the price and the currency.

The screenshot shows the 'New offering' wizard at Step 8: Price Plans. The sidebar and step list are identical to the previous screenshot. The main panel displays 'Step 8: Price Plans' with a message 'No price plans included.' and a 'New price plan' button. Below this, there are input fields for 'Enter a name' (containing 'Single payment plan'), 'Enter a price' (containing '10' and a currency dropdown set to 'EUR'), and 'Enter a description (optional)' (containing 'a 10 EUR payment plan'). There is also a 'Choose a type' dropdown set to 'ONE TIME'. A 'Price Alteration' dropdown is set to 'None'. At the bottom, there is a 'Create' button and a 'Next' button.

If you choose *recurring*, you have to provide the price, the currency, and the period between charges.

 My Stock

 Shopping Cart  fdelavega

Home

My inventory

My stock

Revenue sharing

Catalogs

Product specifications

Offerings

List

New

New offering

1 General

2 Bundle

3 Product Spec.

4 Catalogue

5 Category

6 License



7 SLA

8 Price Plans

9 RS Model

10 Finish

Step 8: Price Plans

Name	Description	Price	Price alteration	Actions
Single payment plan	a 10 EUR payment plan	10 EUR		 

New price plan

Enter a name

Subscription plan

Enter a price

1

EUR

Choose a type

RECURRING

Choose a charge period

/

MONTHLY

Enter a description (optional)

A monthly payment of 1 EUR

Price Alteration

None

Create

Next

If you choose usage, you have to provide the unit to be accounted, the currency, and the price per unit

1.4. User Guide

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The screenshot shows the 'My Stock' interface with a sidebar menu on the left containing: Home, My inventory, My stock (highlighted), Revenue sharing, Catalogs, Product specifications, and Offerings. The main content area is titled 'New offering' and shows a progress list on the left with steps 1 through 10. Step 8, 'Price Plans', is currently selected and highlighted in blue.

Step 8: Price Plans

Name	Description	Price	Price alteration	Actions
Single payment plan	a 10 EUR payment plan	10 EUR		
Subscription plan	A monthly payment of 1 EUR	1 EUR / monthly		

New price plan

Enter a name:

Choose a type:


Enter a price:



Enter a unit:

Enter a description (optional):

Price Alteration:

In addition to the basic pricing models it is possible to include price alterations using the *Price Alteration* section. In this regard, it is possible to provide two types of alterations: (1) Price components, enable to extend the model with a complementary pricing (e.g an initial or recurring fixed payment in a usage model). (2) fees and discounts, which are applied to the original model when some condition is satisfied (e.g a 2% discount when more that 10k calls has been made)

 My Stock

 Shopping Cart  fdelavega

Catalogs

Product specifications

Offerings

3 Product Spec.

4 Catalogue

5 Category





6 License

7 SLA

8 Price Plans

9 RS Model

10 Finish

Single payment plan	a 10 EUR payment plan	10 EUR	 
Subscription plan	A monthly payment of 1 EUR	1 EUR / monthly	 

New price plan

Enter a name

Usage plan

Choose a type

USAGE ▼

Enter a price

0.1

AUD ▼

Enter a unit

/

api class

Enter a description (optional)

1 cent per api call

Price Alteration

Price component ▼

Choose a type

ONE TIME ▼

Enter a price

5

Enter a description (optional)

Initial payment of 5 EUR

Create

Next

My Stock
 Shopping Cart
fdelavega

- Catalogs
- Product specifications
- Offerings

- 3 Product Spec.
- 4 Catalogue
- 5 Category
- 6 License
- 7 SLA
- 8 Price Plans**
- 9 RS Model
- 10 Finish

Single payment plan	a 10 EUR payment plan	10 EUR		
Subscription plan	A monthly payment of 1 EUR	1 EUR / monthly		

New price plan

Enter a name
 Usage plan

Choose a type
 USAGE

Enter a price
 0.1 AUD

Enter a unit
 / api class

Enter a description (optional)
 1 cent per api call

Price Alteration
 Discount or fee

Choose a type
 Discount

Enter a value
 2 %

Enter a price condition
 GE 10000

Enter a description (optional)

Create

Next

You can update or remove plans by clicking on the corresponding action button.

My Stock
 Shopping Cart
fdelavega

- Home
- My inventory
- My stock**
- Revenue Sharing

- Catalogs
- Product Specifications
- Offerings

- 3 Product Spec.
- 4 Catalogue
- 5 Category
- 6 Price Plans**
- 7 RS Model
- 8 Finish

List New

New offering

Step 6: Price Plans

Name	Description	Price	Actions
Single payment plan	A 10 EUR payment price plan	10 EUR	
Subscription plan	A monthly payment of 1 EUR	1 EUR / MONTHLY	
Usage plan	5 cents per call to the service	0.5 EUR / CALL	

New price plan

Next

Once you have created you pricing model click on *Next*

The screenshot shows the 'My Stock' section of the FIWARE Inforum interface. The left sidebar contains a menu with 'Home', 'My inventory', 'My stock' (highlighted), 'Revenue Sharing', 'Catalogs', 'Product Specifications', and 'Offerings'. The main content area is titled 'New offering' and shows a progress list on the left with steps 1 through 8. Step 6, 'Price Plans', is currently selected. The main panel displays 'Step 6: Price Plans' with a table of existing plans and a 'New price plan' button.

Name	Description	Price	Actions
Single payment plan	A 10 EUR payment price plan	10 EUR	
Subscription plan	A monthly payment of 1 EUR	1 EUR / MONTHLY	

Below the table is a 'New price plan' button. A 'Next' button is located at the bottom right of the main panel.

In the last step of the process, you have to choose the revenue sharing model to be applied to you offering between the available ones. Once done, click on *Next* and then on *Create*.

The screenshot shows the 'My Stock' section of the FIWARE Inforum interface. The left sidebar is the same as in the previous screenshot. The main content area is titled 'New offering' and shows the progress list with step 7, 'RS Model', selected. The main panel displays 'Step 7: RS Model' with a table of revenue sharing models and a 'Next' button.

Product Class	Platform Percentage	Provider Percentage	N° Stakeholders
defaultRevenue	30	70	0

A 'Next' button is located at the bottom right of the main panel.

7 RS Model

8 Finish

Places

EU

Product Spec.

Status	Name	Type	Updated
● Launched	Basic Chart	Single	16 hours ago

Catalogue

Status	Name	RoI	Updated
● Launched	Widgets Catalog	Owner	17 hours ago

Categories

Name	Updated
Cloud Services / VM Services	18 hours ago

Price plans

#	Name	Description	Price
1	Single payment plan	A 10 EUR payment price plan	10 EUR
2	Subscription plan	A monthly payment of 1 EUR	1 EUR / MONTHLY

Revenue Sharing Model

Product Class	Platform Percentage	Provider Percentage	N° Stakeholders
defaultRevenue	30	70	0

Create

Sellers can also edit their offerings. To do that click on the offering to be updated.

FIWARE Inforum My Stock

Shopping Cart fdelavega

Home

My inventory

My stock

Revenue Sharing

Catalogs

Product Specifications

Offerings

List

New

Search...

Search

Filters

WireCloud

Single

Basic Chart

v0.1 a few seconds ago

This offering includes the basic chart widget

Active

WireCloud Mashup displaying air quality data

Single

Air Quality

v0.1 6 minutes ago





Launched

In the displayed form, change the fields you want to edit and click on *Update*. Note that for start selling you offering you have to update its status to *Launched*

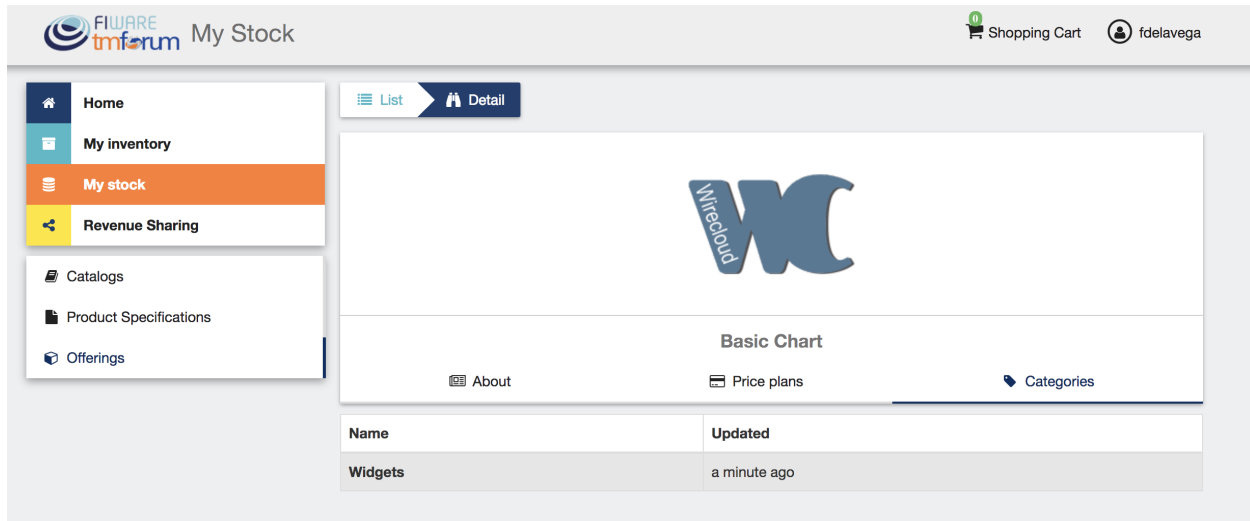
The screenshot shows the 'My Stock' interface with the 'Basic Chart' offering selected. The left sidebar contains navigation links: My inventory, My stock (highlighted), Revenue Sharing, Catalogs, Product Specifications, and Offerings. The main content area displays the 'Basic Chart' offering details, including a 'Wirecloud' logo, a 'Basic Chart' title, and tabs for 'About', 'Price plans', and 'Categories'. The 'General' section includes fields for Name (Basic Chart), Version (0.1), Product Spec. (Basic Chart), Status (Active, Launched, Retired, Obsolete), Description (optional) (This offering includes the basic chart widget), and Places (EU). An 'Update' button is visible at the bottom right.

It is also possible to update the *Price Plans* and *Categories* of the offering by accessing to the related tab.

The screenshot shows the 'My Stock' interface with the 'Basic Chart' offering selected. The left sidebar contains navigation links: Home, My inventory, My stock (highlighted), Revenue Sharing, Catalogs, Product Specifications, and Offerings. The main content area displays the 'Basic Chart' offering details, including a 'Wirecloud' logo, a 'Basic Chart' title, and tabs for 'About', 'Price plans', and 'Categories'. The 'Price plans' tab is active, showing a table with the following data:

Name	Description	Price	Actions
Single payment plan	A 10 EUR payment plan	10 EUR	 
Subscription plan	A monthly payment of 1 EUR	1 EUR / MONTHLY	 

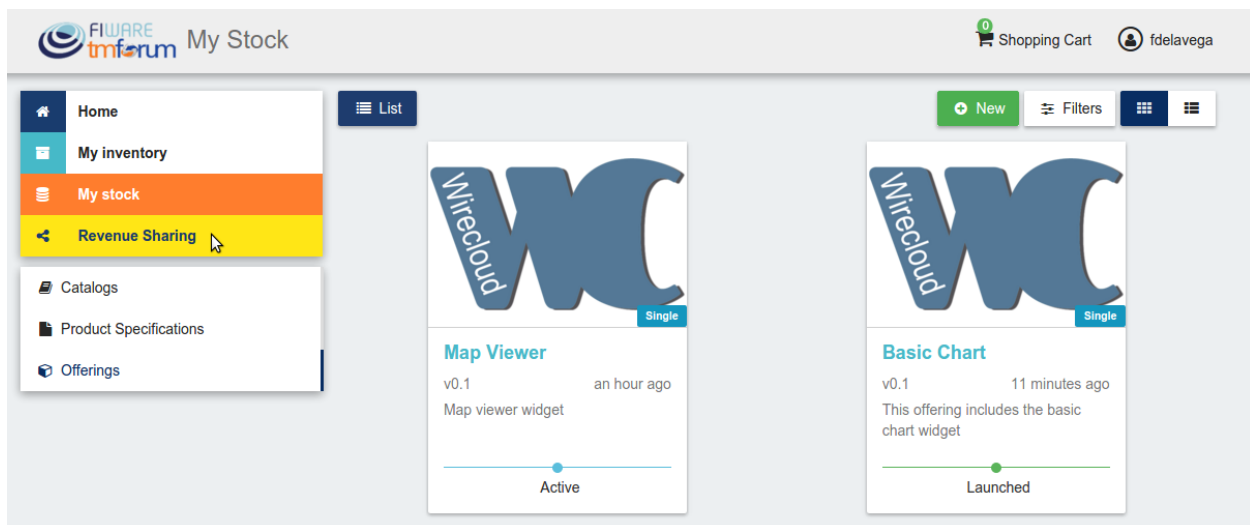
Below the table, there is a 'New price plan' button.



Manage Revenue Sharing Models

Revenue Sharing Models specify how the revenues generated by an offering or set of offerings must be distributed between the owner of the Business API Ecosystem instance, the provider of the offering, and the related stakeholders involved.

To manage RS models go to the *Revenue Sharing* section.



In this view, you can see the revenue sharing models you have available. By default it will appear the default RS model which establishes the revenue distribution between you and the Business API Ecosystem instance owner.

The screenshot shows the FIWARE tmforum Revenue Sharing interface. On the left is a sidebar menu with options: Home, My inventory, My stock, Revenue Sharing (highlighted), RS Models, Transactions, and RS Reports. The main area has a 'List' button and a 'New' button (green with a plus icon). Below the buttons is a table with the following data:

Product Class	Platform Percentage	Provider Percentage	N° Stakeholders
defaultRevenue	30	70	0

You can create a new RS model clicking on *New*

This screenshot is identical to the previous one, but with a mouse cursor hovering over the 'New' button, indicating the action to be taken.

In the first step of the process you have to provide a product class, which identifies the RS model, and the percentage you want to receive. The platform percentage is fixed and cannot be modified. Once provided click on *Next*

The screenshot shows the 'New RS model' form. The 'List' button is disabled and the 'New' button is active. The form has a progress bar with three steps: 1 General (selected), 2 Stakeholders, and 3 Finish. The 'Step 1: General' section contains the following fields:

- Product class:** A text input field containing 'widgets'.
- Platform percentage:** A text input field containing '30' followed by a '%' symbol.
- Provider percentage:** A text input field containing '50' followed by a '%' symbol.

A 'Next' button is located at the bottom right of the form.

In the next step, you can optionally add more stakeholders to the RS model. To do that click on *New Stakeholder*

FIWARE **tmforum** Revenue Sharing

Shopping Cart fdelavega

Home
My inventory
My stock
Revenue Sharing
RS Models
Transactions
RS Reports

List New

New RS model

1 General
2 Stakeholders
3 Finish

Step 2: Stakeholders

No stakeholders included.

+ New stakeholder

Next

Then, select the Stakeholder between the available users, and provide its percentage. Finally, save it clicking on *Create*

FIWARE **tmforum** Revenue Sharing

Shopping Cart fdelavega

Home
My inventory
My stock
Revenue Sharing
RS Models
Transactions
RS Reports

List New

New RS model

1 General
2 Stakeholders
3 Finish

Step 2: Stakeholders

No stakeholders included.

Select stakeholder

store_customer

Stakeholder percentage

20 %

Create Cancel

Next

Note: The total percentage (provider + platform + stakeholders) must be equal to 100

Finally, click on *Next* and then on *Create*

FIWARE **tmforum** Revenue Sharing

Shopping Cart fdelavega

Home
My inventory
My stock
Revenue Sharing
RS Models
Transactions
RS Reports

List New

New RS model

1 General
2 Stakeholders
3 Finish

Step 2: Stakeholders

User	Percentage	Delete
store-customer	20 %	

+ New stakeholder

Next

New RS model

Step 3: Finish

General

Product class

widgets

Platform percentage

30 %

Provider percentage

50 %

Stakeholders

User	Percentage
store-customer	20 %

Total: 100 %

Create

Sellers can also update their RS model. To do that click on the RS model to be updated.

List

Product Class	Platform Percentage	Provider Percentage	N° Stakeholders
defaultRevenue	30	70	0
widgets	30	50	1

New

Then, update the required fields (including the stakeholders if you want), and click on *Save Changes*

FIWARE **Infocenter** Revenue Sharing Shopping Cart fdelavega

Home My inventory My stock **Revenue Sharing** RS Models Transactions RS Reports

List Detail

widgets About

Product class
widgets

Platform percentage 30 % Provider percentage 50 %

User	Percentage	Delete
store-customer	20 %	

Total: 100 %

Save changes

Manage Transactions

Sellers can manage the transactions related to their products in order to know how much money their products are generating, and to launch the revenue sharing process. To manage your seller transactions go to *Revenue Sharing* and click on *Transactions*

FIWARE **Infocenter** Revenue Sharing Shopping Cart fdelavega

Home My inventory My stock **Revenue Sharing** RS Models **Transactions** RS Reports

List New

Product Class	Platform Percentage	Provider Percentage	N° Stakeholders
defaultRevenue	30	70	0
widgets	30	50	1

In the displayed view, you can see the transactions pending to be paid to you and your stakeholders. It is also possible to display the transactions in tabular way

The screenshot shows the FIWARE Inforum Revenue Sharing interface. On the left is a navigation menu with options: Home, My inventory, My stock, Revenue Sharing (highlighted), RS Models, Transactions, and RS Reports. The main content area displays two transaction details for 'defaultRevenue' by 'fi-lab-user-example'.

Transaction 1: Tue, Sep 13th 2016, 13:22
 Transaction Type: Charge
 Product Offering: 19 Basic Chart 0.1
 Charged Amount: 10 EUR
 Description: One time payment: 10.00 EUR

Transaction 2: Tue, Sep 13th 2016, 14:02
 Transaction Type: Charge
 Product Offering: 24 Nice Phone 0.1
 Charged Amount: 300 EUR
 Description: One time payment: 300.00 EUR

The screenshot shows the FIWARE Inforum Revenue Sharing interface with a table of transactions. The navigation menu is the same as in the previous screenshot.

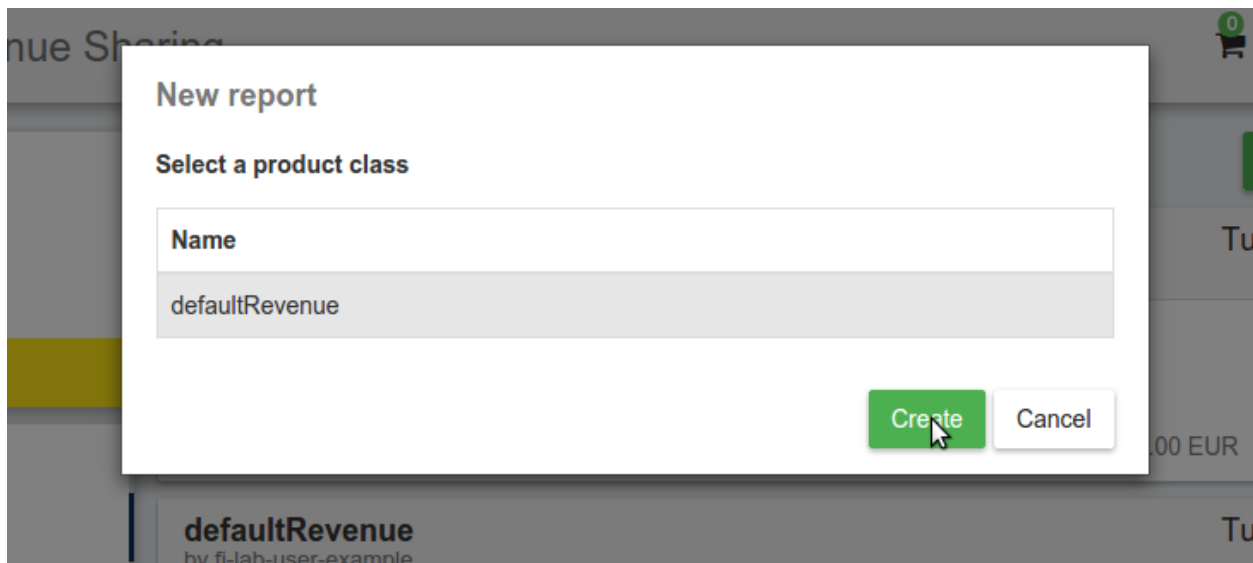
Timestamp	Type	Product class	Customer	Product offering	Amount	Description
Tue, Sep 13th 2016, 13:22	Charge	defaultRevenue	fi-lab-user-example	19 Basic Chart 0.1	10 EUR	One time payment: 10.00 EUR
Tue, Sep 13th 2016, 14:02	Charge	defaultRevenue	fi-lab-user-example	24 Nice Phone 0.1	300 EUR	One time payment: 300.00 EUR

These transactions are aggregated and paid by the Business API Ecosystem periodically once a month. Nevertheless, if you need to be paid, you can force the revenue sharing calculus and payment of your pending transactions by manually generating a revenue sharing report.

To create a new report click on *New Report*

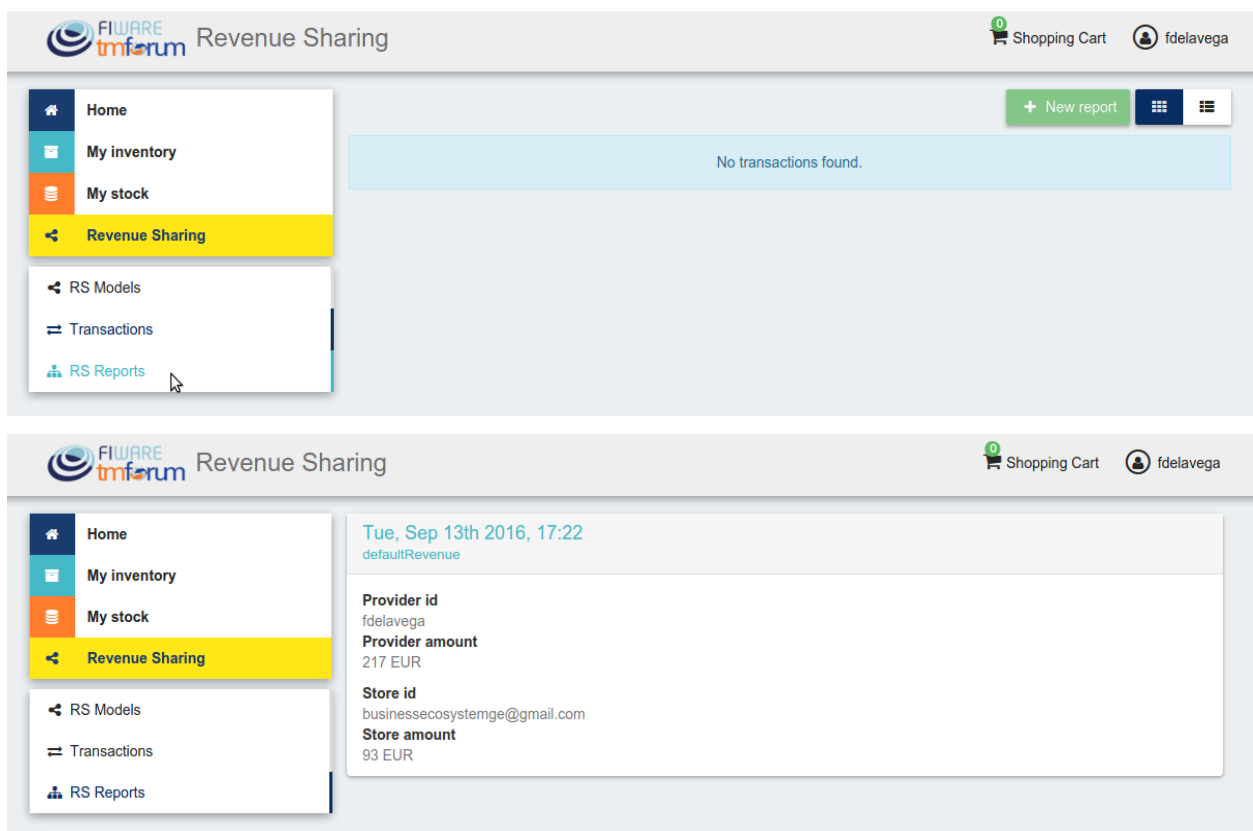
This screenshot is identical to the one above, showing the transaction details. A mouse cursor is pointing at the '+ New report' button in the top right corner of the main content area.

In the displayed modal, choose the product classes to be calculated and click on *Create*



This process will aggregate all the transactions with the selected product classes, calculate the amount to be paid to each stakeholder using the related revenue sharing model, generate a revenue sharing report, and pay the seller and the stakeholders using their PayPal account.

You can see the generated reports clicking on *RS Reports*

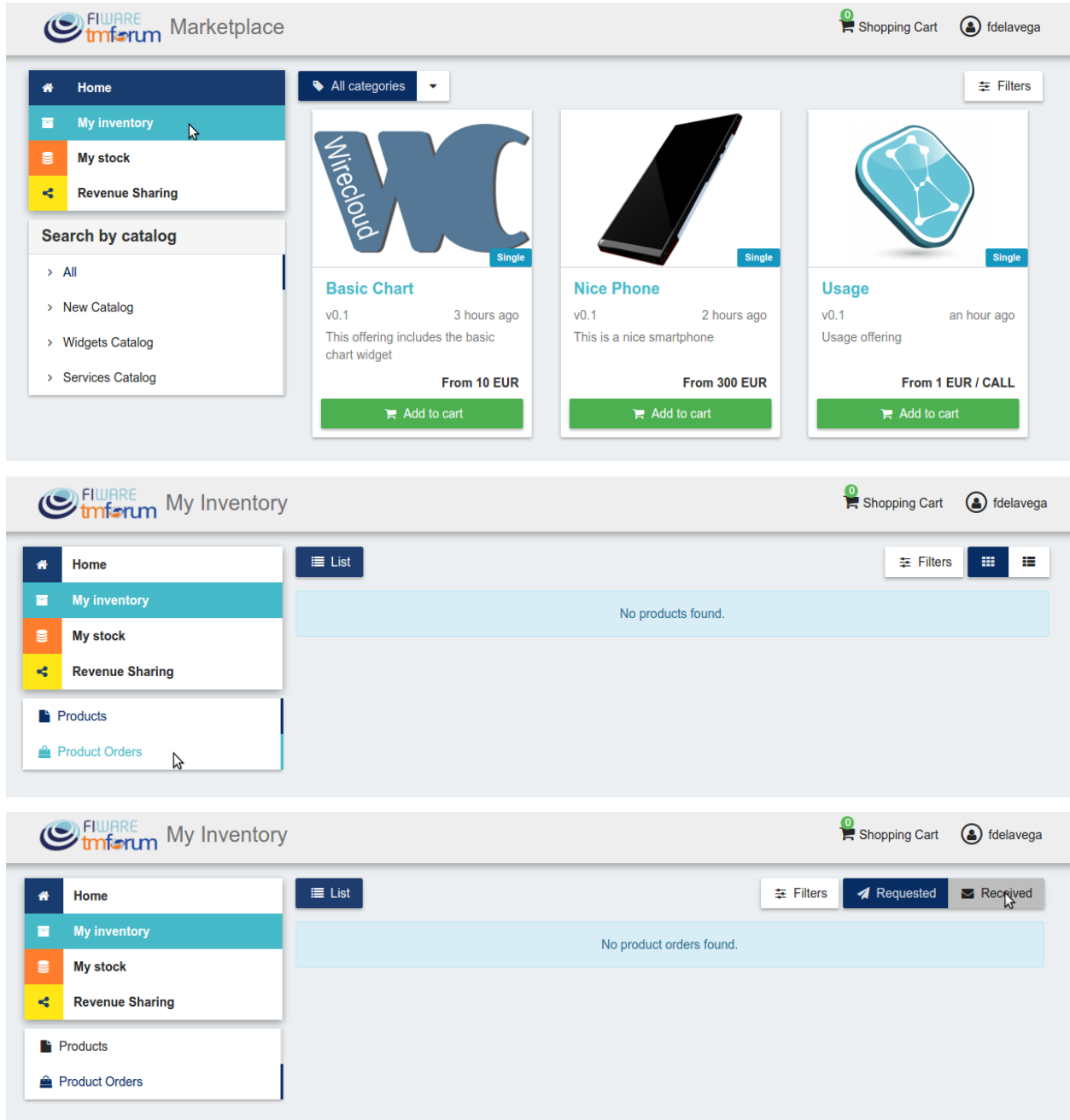


Note: Sellers would need to have a PayPal account associated to the email of their FIWARE IdM account in order to be paid for their products

Manage Received Orders

Sellers can manage the orders they have received in order to see the chosen characteristics, read customer notes, or process the order in case it has been acquired a physical product.

To view your received orders go to *My inventory* section, click on *Product orders*, and open the *Received* section.



You can view the details of a received order clicking on the order date

The screenshot shows the 'My Inventory' application interface. On the left is a sidebar with navigation links: Home, My inventory (selected), My stock, Revenue Sharing, Products, and Product Orders. The main content area has a top bar with 'List', 'Filters', 'Requested', and 'Received' tabs. Below this, a header shows 'Today at 1:55 PM' and a timestamp 'Tuesday, September 13th 2016, 1:55 pm'. The product details for 'Nice Phone' are displayed, including a description, state (Acknowledged), price (300 EUR), and appointment (No appointment included). At the bottom of the product card are 'Sent' and 'Reject' buttons.

In the displayed view you can review the details of the order and the details of your products acquired by the customer, including the chosen characteristics.

Additionally, you can view the customer notes clicking on the *Notes* tab

This screenshot shows the 'My Inventory' application with the 'Order details' and 'Notes' tabs selected. The 'Order details' section displays customer information (Name, Customer name, Notification email, Shipping address) and order information (Order date, Priority, Status, Desired delivery date, Expected delivery date). Below this, the 'Products' tab is active, showing 'Product 1' with its image, offering name ('Nice Phone'), status (Acknowledged), vendor name (fdelavega), characteristics (Color: white), and price (300 EUR). The 'Notes' tab is also visible at the bottom right of the product section.

You can also give a reply to customer notes including it in the text area and clicking on the send button

My Inventory

Shopping Cart fdelavega

Home My inventory My stock Revenue Sharing Products Product Orders

List Details

Order details

Name
No data provided.

Customer name
fi-lab-user-example

Notification email
pablo@email.com

Shipping address
Campus de Montegancedo S/N
28041 Madrid (Madrid)
Spain

Order date
Tuesday, September 13th 2016, 1:55 pm

Priority
4

Status
InProgress

Desired delivery date
Tuesday, September 13th 2016, 1:55 pm

Expected delivery date
No data provided

Products Notes

Notes

Enter a note

There are't any remaining silver phone

fi-lab-user-example
Today at 2:16 PM I prefer the silver phone instead

If the acquired product is not digital, the order needs to be processed manually by the seller, in the sense that the seller will have to send the acquired product to the customer. To deal with this situation, the order details view allows sellers to manually change the status of the order.

To reject a received order you have to click in the *Reject* button located in the search or in the details view of the order.

My Inventory

Shopping Cart fdelavega

Home My inventory My stock Revenue Sharing Products Product Orders

List Filters Requested Received

Today at 1:55 PM

Customer fi-lab-user-example

Status InProgress

Priority 4

Nice Phone

Description
This is a nice smartphone

State
Acknowledged

Price
300 EUR

Appointment
No appointment included.

Sent Reject

The screenshot shows the 'My Inventory' application interface. On the left is a sidebar with navigation links: Home, My inventory, My stock, Revenue Sharing, Products, and Product Orders. The main content area is titled 'Order details' and displays information for 'Product 1'. The order details include:

- Name:** No data provided.
- Customer name:** fi-lab-user-example
- Notification email:** pablo@email.com
- Shipping address:** Campus de Montegancedo S/N, 28041 Madrid (Madrid), Spain
- Order date:** Tuesday, September 13th 2016, 1:55 pm
- Priority:** 4
- Status:** InProgress
- Desired delivery date:** Tuesday, September 13th 2016, 1:55 pm
- Expected delivery date:** No data provided

Below the order details, there is a section for 'Product 1' showing an image of a smartphone and its characteristics:

- Offering:** Nice Phone
- Status:** Acknowledged
- Vendor name:** fdelavega
- Characteristics:** Color: white
- Price:** 300 EUR

A 'Reject' button is visible in the top right corner of the product section.

In case you accept the order and send the product to the customer, you have to put it as *inProgress* clicking on the *Sent* button

The screenshot shows the 'My Inventory' application interface after the order has been accepted. The main content area is titled 'Today at 1:55 PM' and displays information for 'Product 1'. The order details include:

- Customer:** fi-lab-user-example
- Status:** InProgress
- Priority:** 4

Below the order details, there is a section for 'Product 1' showing an image of a smartphone and its characteristics:

- Description:** This is a nice smartphone
- State:** Acknowledged
- Price:** 300 EUR
- Appointment:** No appointment included.

At the bottom of the product section, there are two buttons: 'Sent' (highlighted) and 'Reject'.

The screenshot shows the 'My Inventory' application interface. On the left is a sidebar with navigation links: Home, My inventory (selected), My stock, Revenue Sharing, Products, and Product Orders. The main content area is titled 'Order details' and displays information for 'Product 1'. The order details are organized into two columns:

Order details	Order details
Name No data provided.	Order date Tuesday, September 13th 2016, 1:55 pm
Customer name fi-lab-user-example	Priority 4
Notification email pablo@email.com	Status InProgress
Shipping address Campus de Montegancedo S/N 28041 Madrid (Madrid) Spain	Desired delivery date Tuesday, September 13th 2016, 1:55 pm
	Expected delivery date No data provided

Below the order details, there is a section for 'Product 1' which includes an image of a smartphone and the following information:

- Offering**: Nice Phone
- Status**: Acknowledged
- Vendor name**: fdelavega
- Characteristics**: Color white
- Price**: 300 EUR

At the top right of the main content area, there are links for 'List' and 'Details', and a 'Set as sent' button.

Finally, when the product arrives at its destination, you have to put it as *Completed* clicking on the *Delivered* button

The screenshot shows the 'My Inventory' application interface after the product has been delivered. The sidebar remains the same. The main content area is titled 'Today at 1:55 PM' and displays information for 'Product 1'. The product details are organized into two columns:

Product details	Product details
Customer fi-lab-user-example	Description This is a nice smartphone
Status InProgress	State InProgress
Priority 4	Price 300 EUR
	Appointment No appointment included.

Below the product details, there is a section for 'Product 1' which includes an image of a smartphone and two buttons: 'Delivered' (highlighted) and 'Reject'.

The screenshot shows the 'My Inventory' page in the FIWARE tmforum interface. The left sidebar contains navigation links: Home, My inventory (selected), My stock, Revenue Sharing, Products, and Product Orders. The main content area is titled 'Order details' and displays the following information:

Order details	
Name No data provided. Customer name fi-lab-user-example Notification email pablo@email.com Shipping address Campus de Montegancedo S/N 28041 Madrid (Madrid) Spain	Order date Tuesday, September 13th 2016, 1:55 pm Priority 4 Status InProgress Desired delivery date Tuesday, September 13th 2016, 1:55 pm Expected delivery date No data provided

Below the order details, there is a section for 'Product 1' showing an image of a smartphone and the following details:

- Offering**: Nice Phone
- Status**: InProgress
- Vendor name**: fdelavega
- Characteristics**: Color white
- Price**: 300 EUR

A 'Set as delivered' button is visible in the top right corner of the product section.

1.4.5 Customer

All of the users of the system have by default the *Customer* role. Customers are able to create orders for acquiring offerings.

List Available Offerings

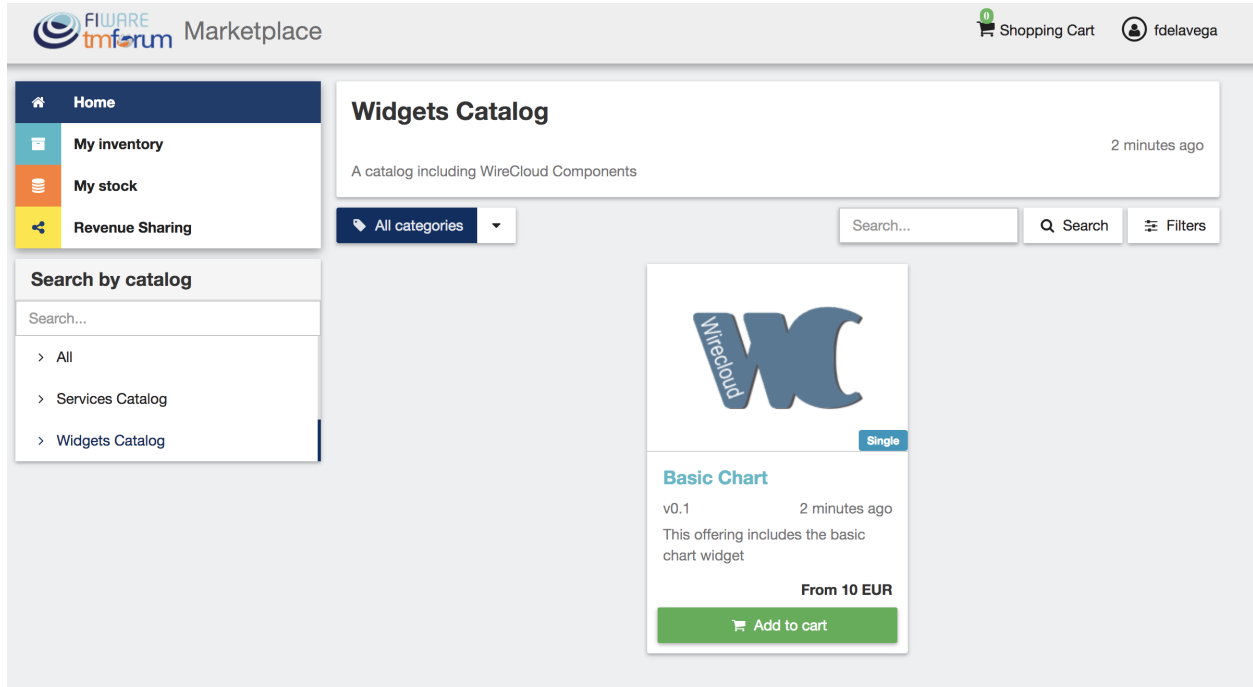
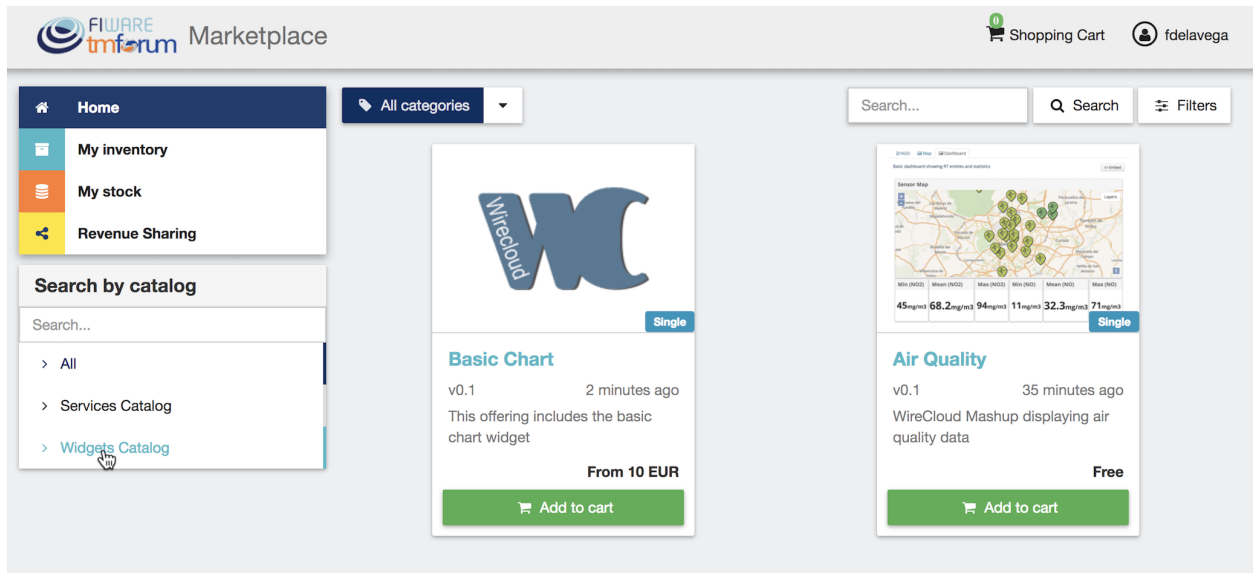
All the available (*Launched*) offerings appear in the *Home* page of the Business API Ecosystem, so they can be seen by customers.

The screenshot shows the 'Marketplace' page in the FIWARE tmforum interface. The left sidebar contains navigation links: Home, My inventory, My stock, Revenue Sharing, and a 'Search by catalog' section with links to All, Services Catalog, and Widgets Catalog. The main content area displays a list of offerings:

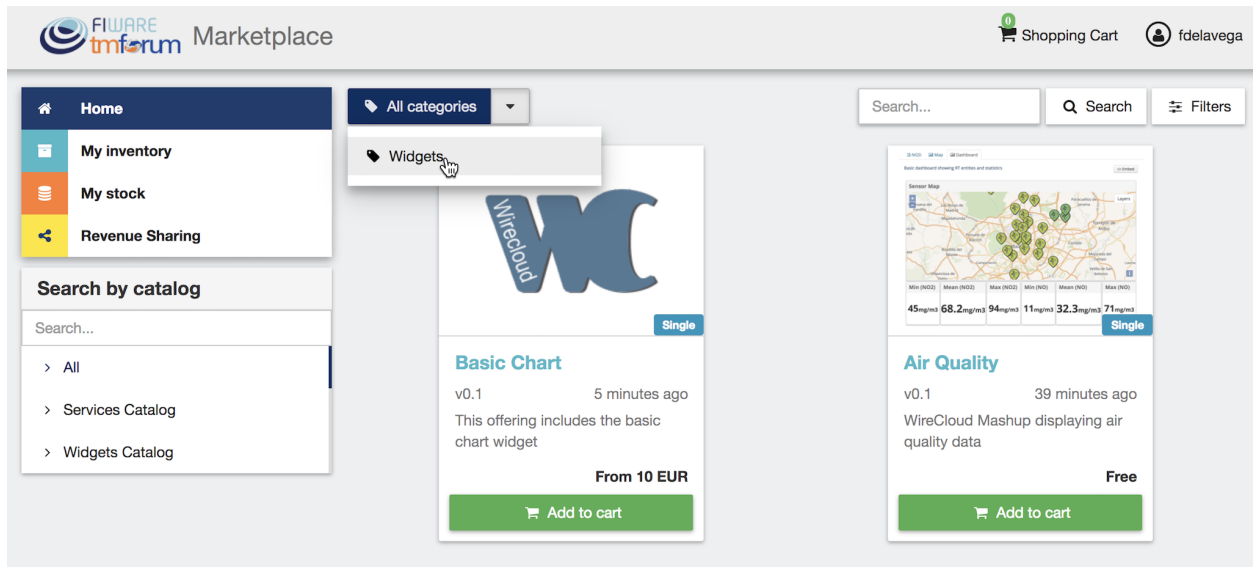
- Wirecloud Basic Chart**: v0.1, a few seconds ago. This offering includes the basic chart widget. Price: From 10 EUR. Add to cart button.
- Air Quality**: v0.1, 34 minutes ago. WireCloud Mashup displaying air quality data. Price: Free. Add to cart button.

The offerings are displayed with their respective logos and a 'Single' button next to each.

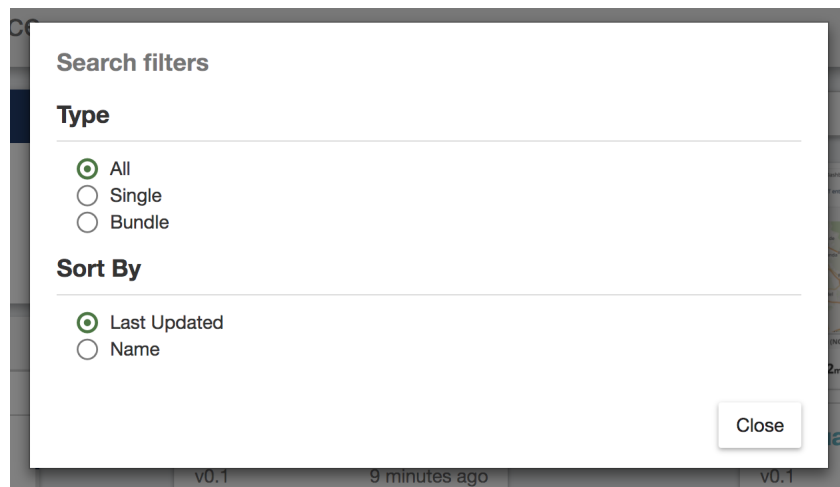
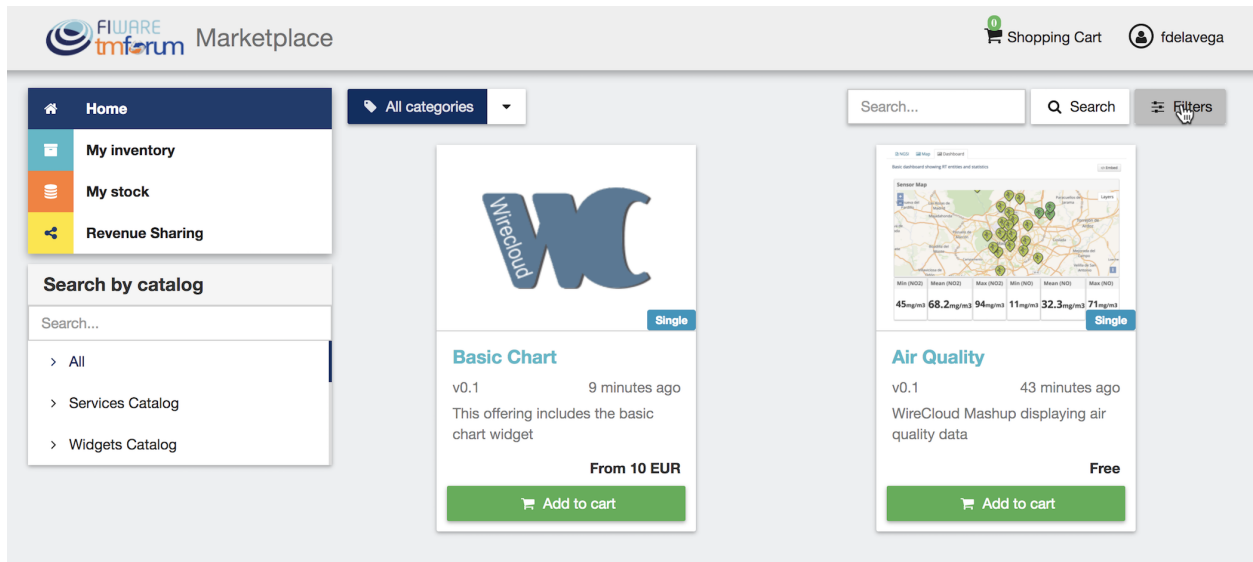
Additionally, customers can select a specific catalog of offerings by clicking on it.



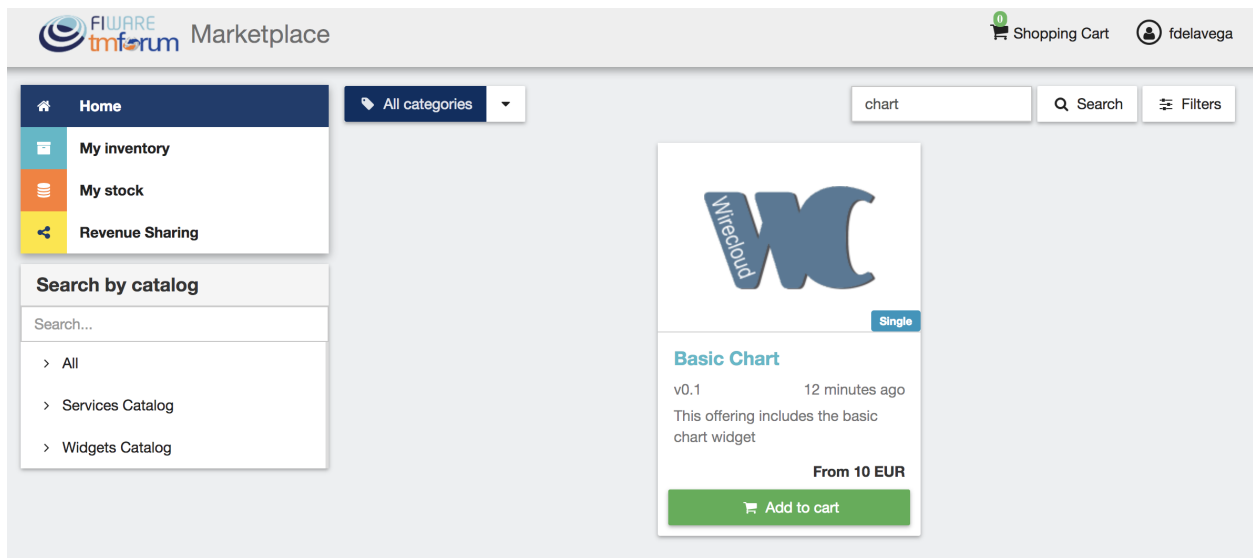
Moreover, customers can filter the shown offerings by category using the categories dropdown and choosing the wanted one.



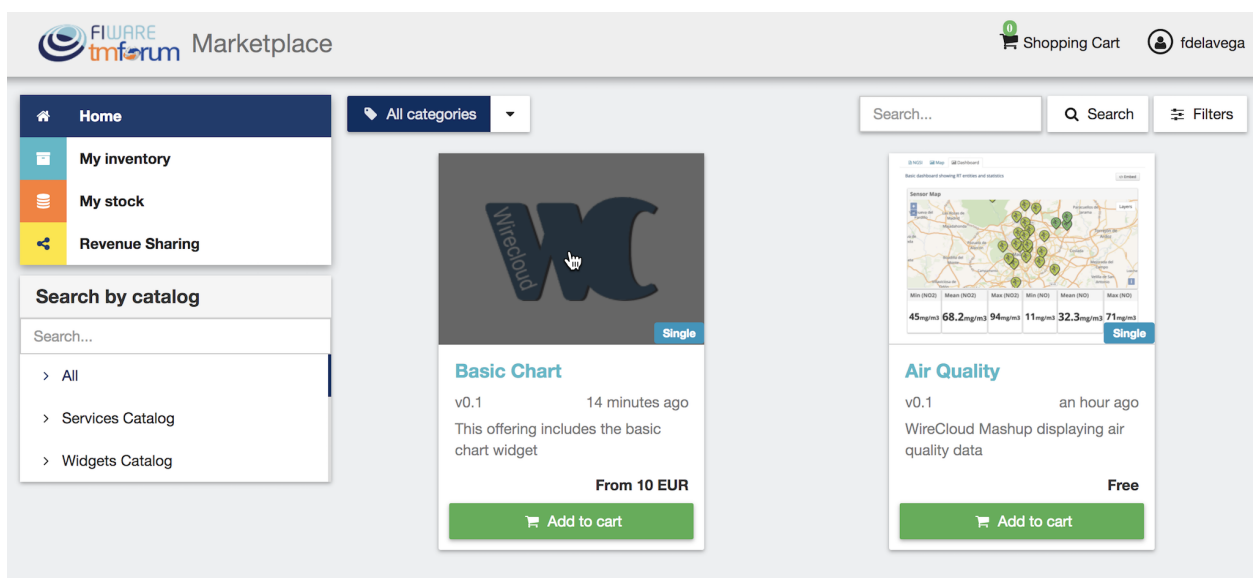
Customers can also filter bundle or single offerings using the *Filters* modal as well as choosing its sorting.




Finally, customers can search offerings by keyword using the provided search bar





Customers can open the details of an offering by clicking on it




In the displayed view, it is shown the general info about the offering and its included product, the characteristics of the product, the price plans of the offering, and the existing relationships.

 Marketplace

 Shopping Cart  fdelavega

[< Back](#) [Details](#)



Basic Chart

[Widgets](#)

From 10 EUR

[Add to cart](#)


[About](#) [Characteristics](#) [Price plans](#) [Relationships](#)



EU

This offering includes the basic chart widget

Extra Info


Offering Version 0.1	Updated Tuesday, December 19th 2017, 5:28 pm
Product Name Basic Chart	Product Version 0.1
Brand UPM	ID Number 2

 Marketplace


 Shopping Cart  fdelavega

[< Back](#)

[Details](#)





Basic Chart


 Widgets

From 10 EUR

[Add to cart](#)

 About

 Characteristics

 Price plans


 Relationships

Chart Type

Type of charts to be used

☒ line

☐ bar

Asset type


Type of the digital asset described in this product specification



☒ WireCloud Component

Media type

Media type of the digital asset described in this product specification


☒ widget

 Marketplace


 Shopping Cart  fdelavega

[< Back](#)

[Details](#)





Basic Chart


 Widgets


From 10 EUR

[Add to cart](#)

 About

 Characteristics

 Price plans

 Relationships

Single payment plan

10 EUR

A 10 EUR payment plan

Subscription plan

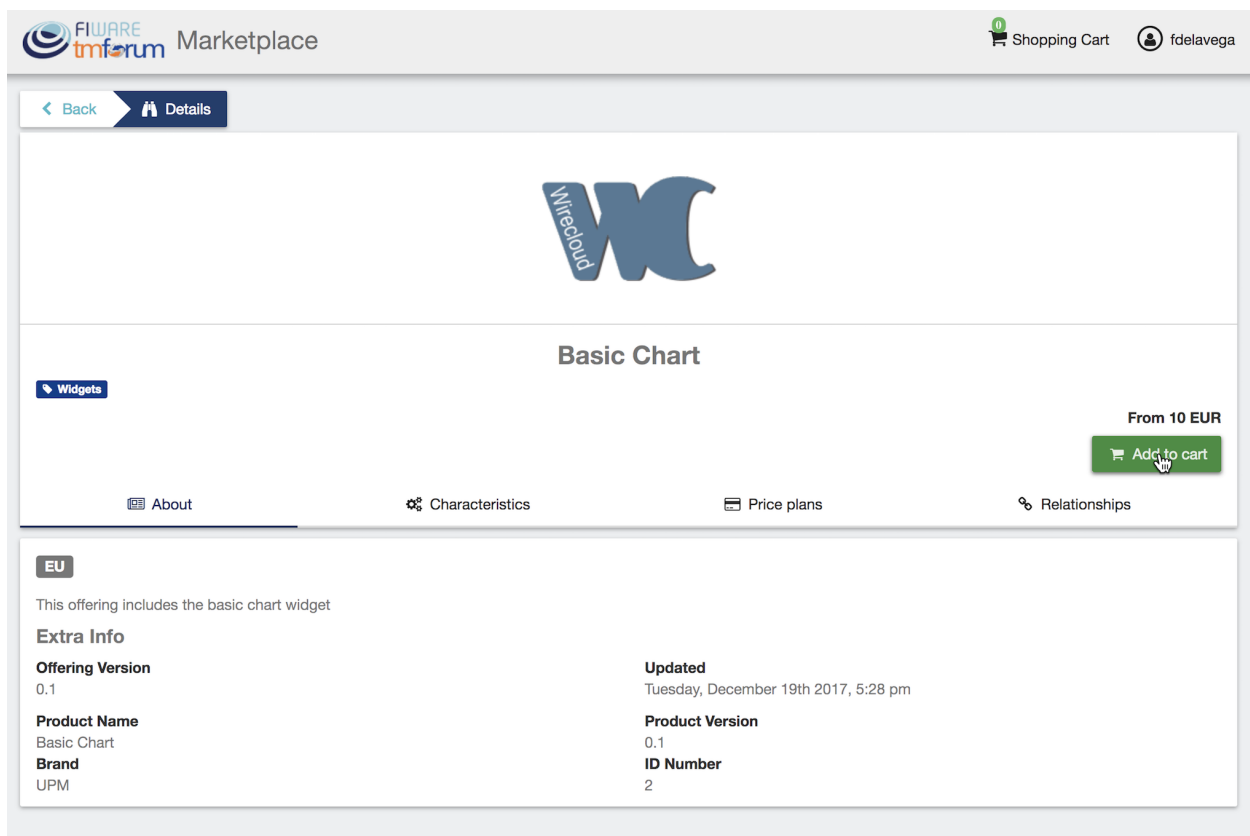
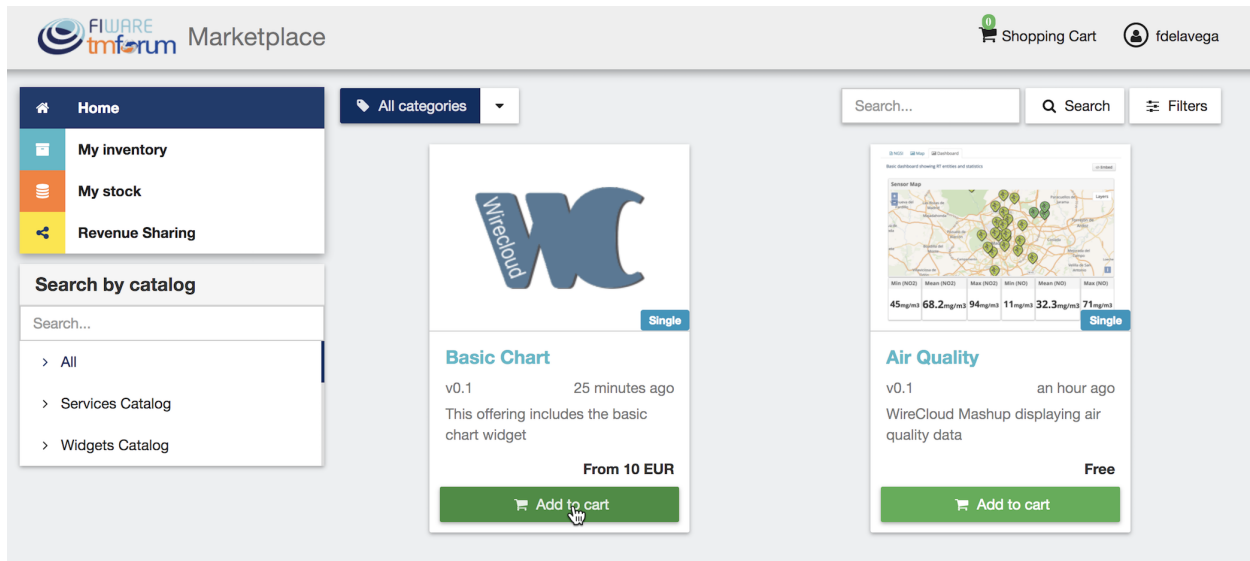
1 EUR
/ monthly

A monthly payment of 1 EUR

Create Order

Customers can create orders for acquiring offerings. The different offerings to be included in an order are managed using the *Shopping Cart*.

To include an offering in the shopping cart there are two possibilities. You can click on the *Add to Cart* button located in the offering panel when searching, or you can click on the *Add to Cart* button located in the offering details view.



If the offering has configurable characteristics, multiple price plans or terms and conditions, a modal will be displayed where you can select your preferred options

Available Options

1. Characteristics

2. Terms & Conditions

3. Price plans

Chart Type

Type of charts to be used

☐ line

☒ bar

Asset type

Type of the digital asset described in this product specification

☒ WireCloud Component

Media type

Media type of the digital asset described in this product specification

☒ widget

Location

URL pointing to the digital asset described in this product specification

☒ http://proxy.docker:8004/charging/media/assets/fdelavega/BasicChart_CoNWeT_panel

Add to cart

Close

Available Options

1. Characteristics

2. Terms & Conditions

3. Price plans

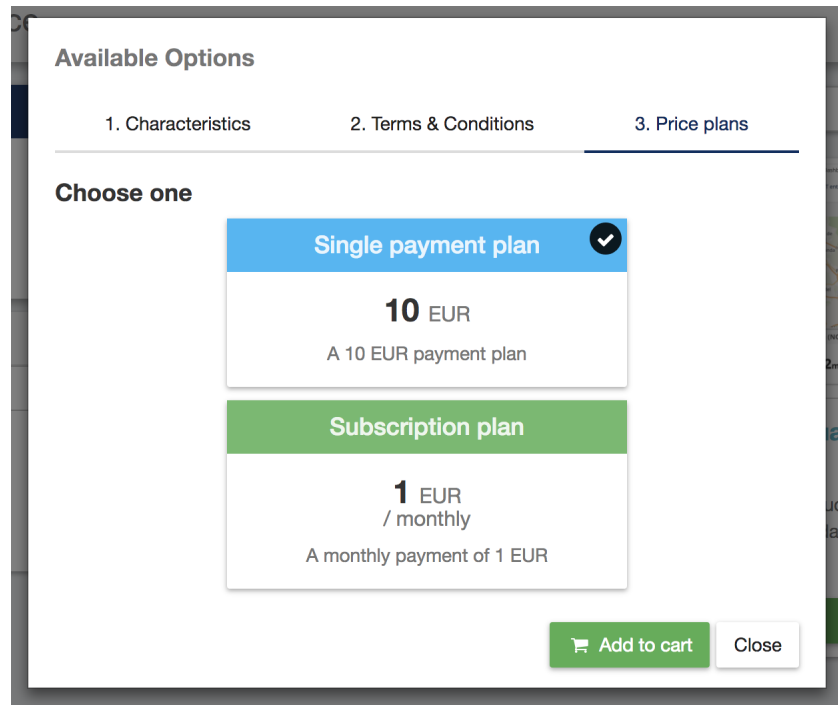
Non-Commercial Use

This widget cannot be used for commercial purposes

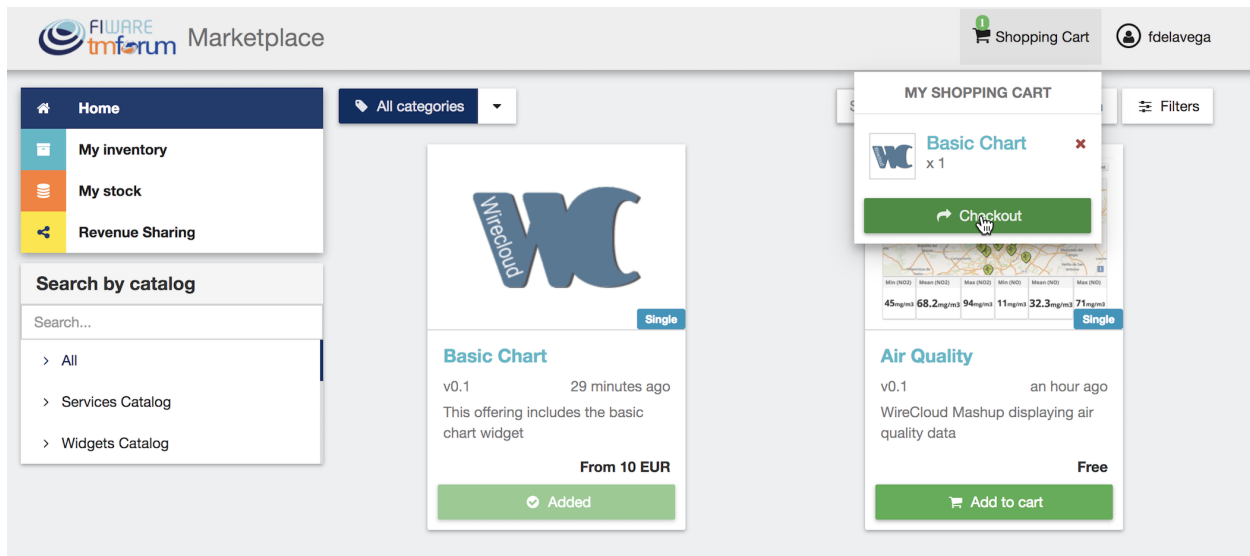
☒ I have read and agreed the terms and conditions

Add to cart

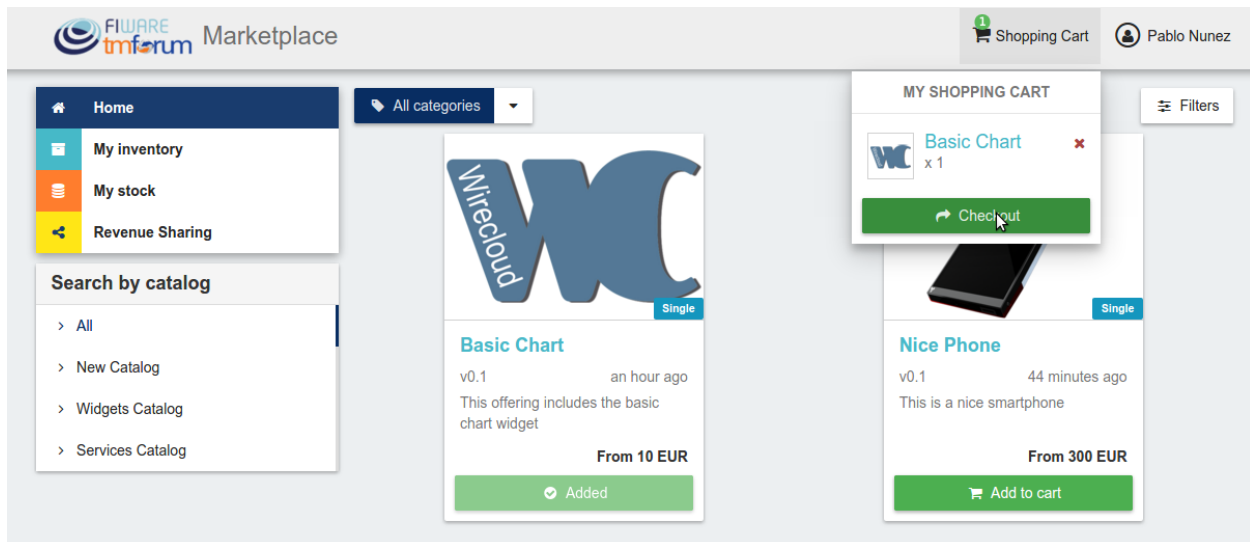
Close



Once you have selected your preferences for the offering click on *Add to Cart*



Once you have included all the offerings you want to acquire to the shopping cart, you can create the order clicking on *Shopping Cart*, and then on *Checkout*



In the displayed form, you can include an optional name, an optional description, or an optional note. Notes can include any additional information you want to provide to the sellers of the acquired offerings.

Then, you have to choose a priority for your order, and select one of your shipping addresses.

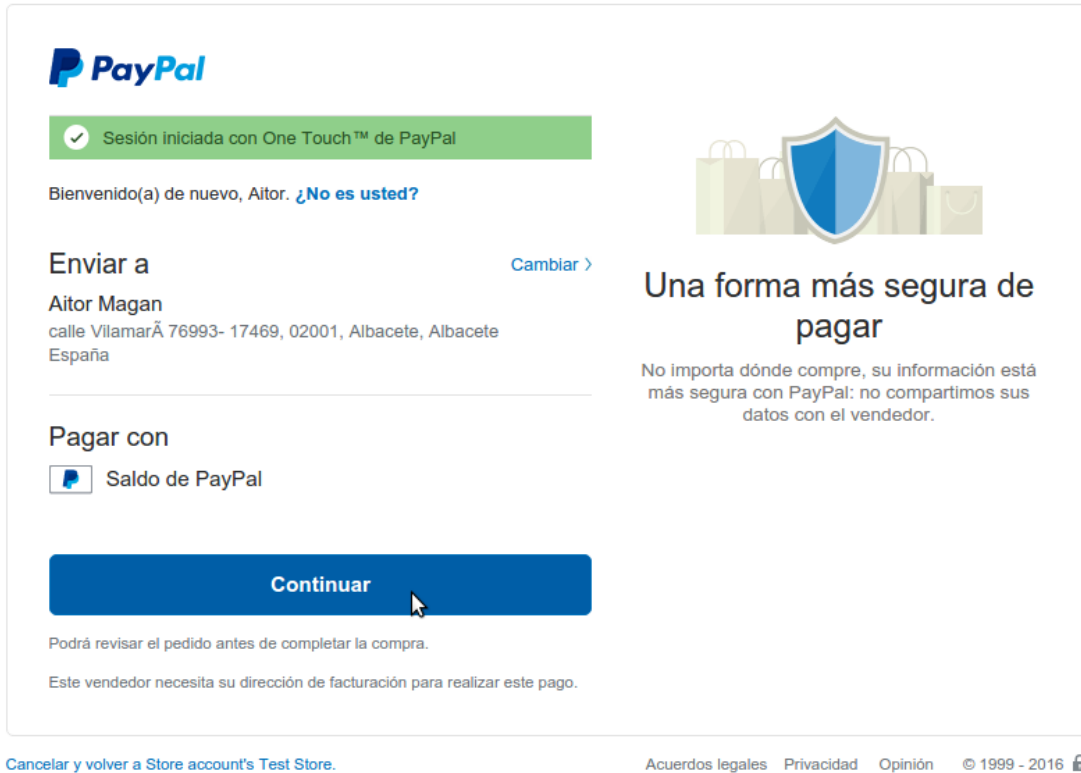
Once you have provided all the required information you can start the order creation clicking on *Checkout*

 The screenshot shows the 'Confirm and checkout' form. It includes fields for 'Enter a name (optional)' (filled with 'My widget order'), 'Choose a priority' (dropdown set to '4 (the lowest)'), 'Enter a description (optional)', and 'Enter a note (optional)' (filled with 'I need to have a bar chart'). Below these is a table for 'Choose a shipping address' with columns for Email address, Postal address, and Telephone number. The table contains one entry for 'pablo@email.com'. At the bottom, a 'Shopping cart' summary shows 'Basic Chart' for '10 EUR' and a 'Checkout' button.

Email address	Postal address	Telephone number
pablo@email.com	Campus de Montegancedo S/N 28041 Madrid (Madrid) Spain	mobile, +34611111111

In the next step, you will be redirected to *PayPal* so you can pay for the offerings according to their pricing models

Store account's Test Store



The screenshot shows the PayPal checkout interface. At the top left is the PayPal logo. Below it, a green banner indicates 'Sesión iniciada con One Touch™ de PayPal'. A welcome message follows: 'Bienvenido(a) de nuevo, Aitor. ¿No es usted?'. The shipping section, titled 'Enviar a', lists the name 'Aitor Magan' and a Spanish address, with a 'Cambiar >' link. The payment section, titled 'Pagar con', shows the 'Saldo de PayPal' option selected. A large blue 'Continuar' button is prominent. To the right, a graphic of shopping bags with a shield is accompanied by the text 'Una forma más segura de pagar' and a security assurance. At the bottom, a blue button says 'Continuar'. The footer contains a link to 'Cancelar y volver a Store account's Test Store.', legal links, and a copyright notice for 1999-2016.

PayPal

Sesión iniciada con One Touch™ de PayPal

Bienvenido(a) de nuevo, Aitor. ¿No es usted?

Enviar a [Cambiar >](#)

Aitor Magan
calle VilamarÃ 76993- 17469, 02001, Albacete, Albacete
España

Pagar con

☒ Saldo de PayPal

[Continuar](#)

Podrá revisar el pedido antes de completar la compra.

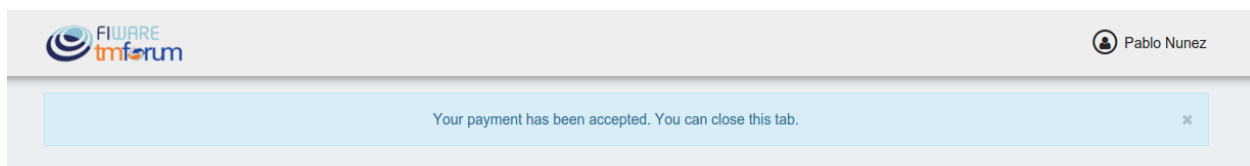
Este vendedor necesita su dirección de facturación para realizar este pago.

Una forma más segura de pagar

No importa dónde compre, su información está más segura con PayPal: no compartimos sus datos con el vendedor.

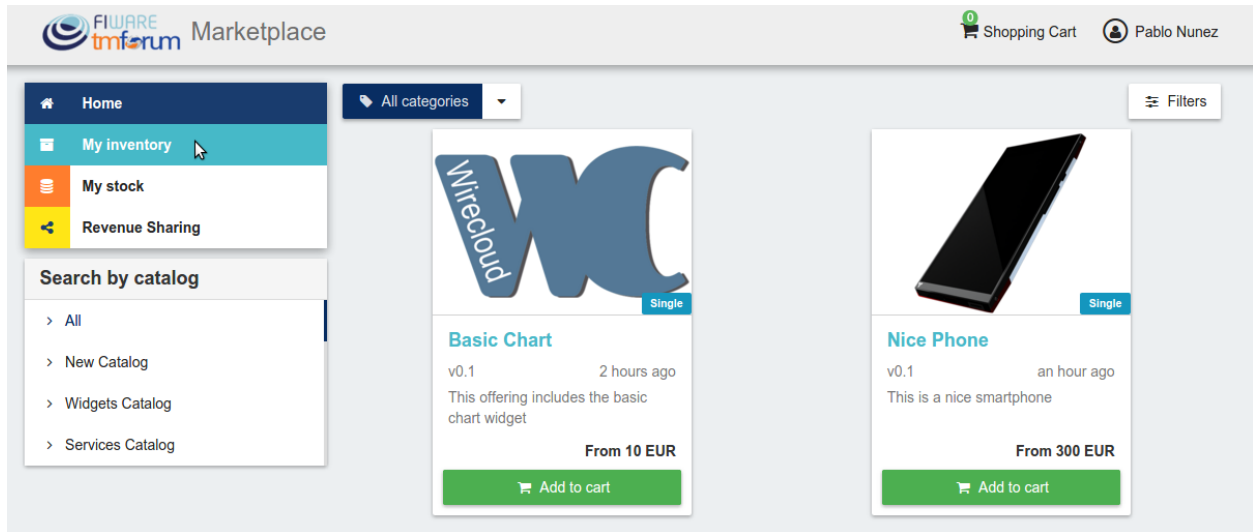
[Cancelar y volver a Store account's Test Store.](#) [Acuerdos legales](#) [Privacidad](#) [Opinión](#) © 1999 - 2016

Finally, you will see a confirmation page

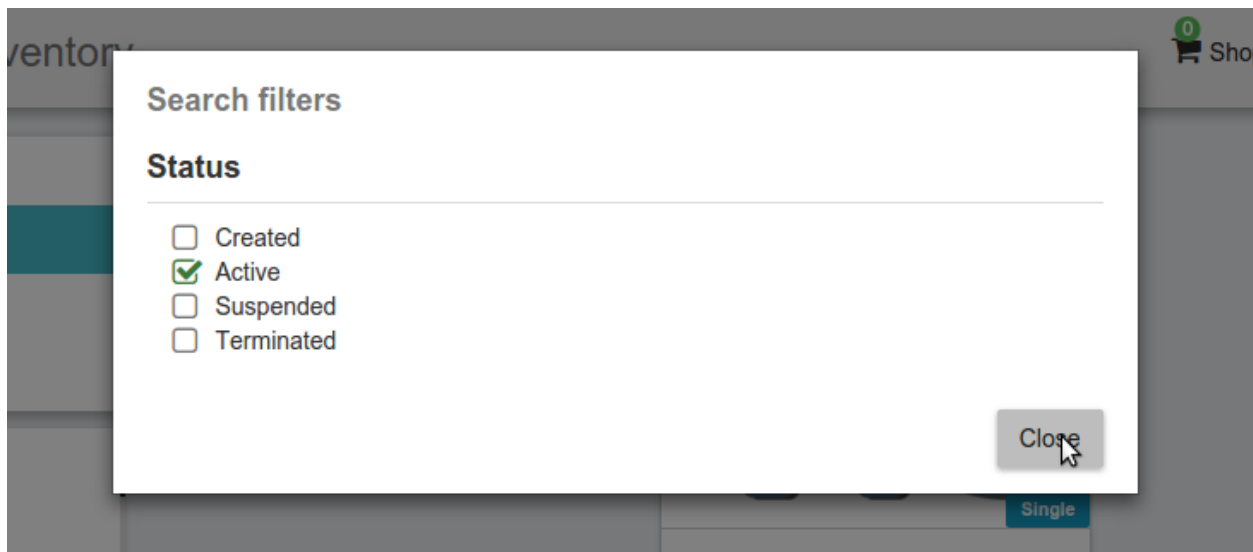
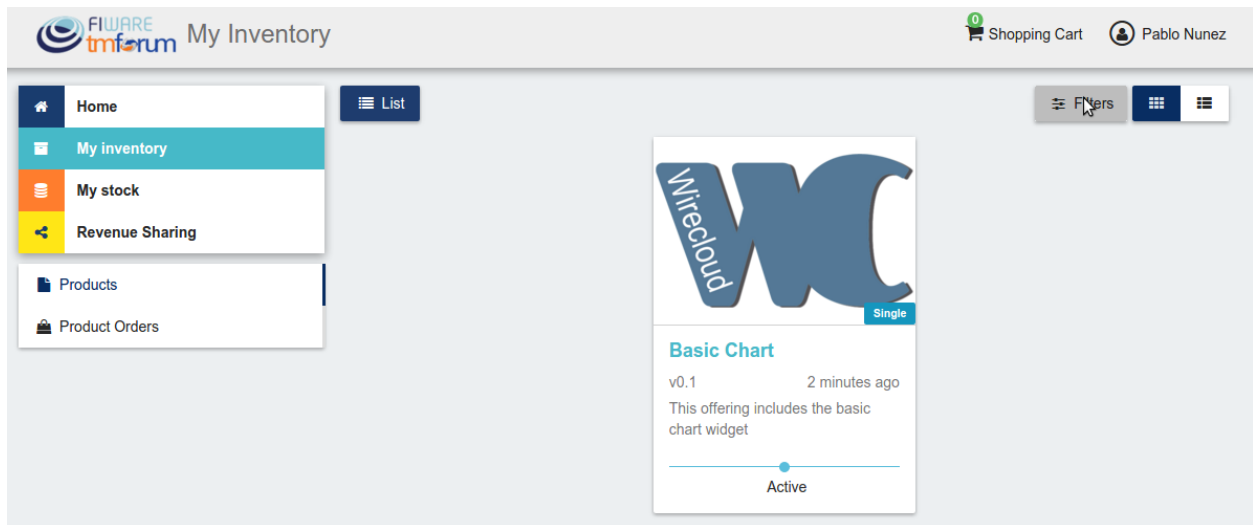


Manage Acquired Products

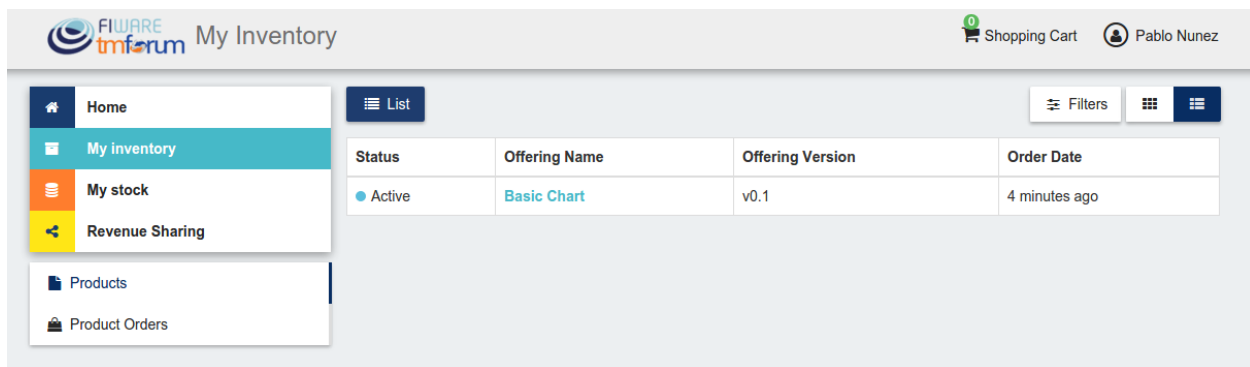
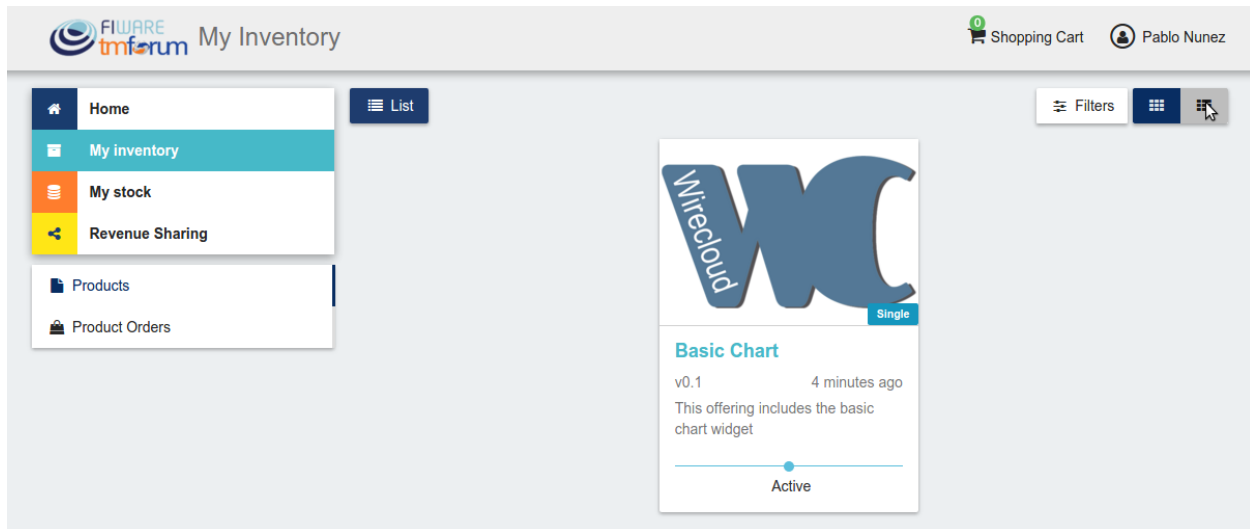
The products you have acquired are located in *My Inventory*, there you can list them, check their status, or download different assets.



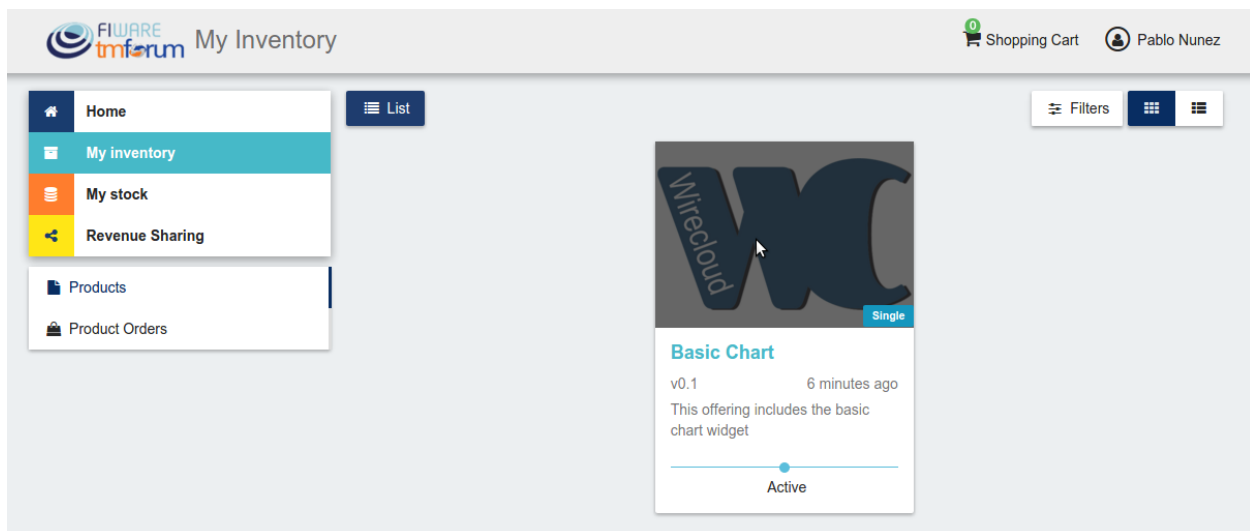
In this view, it is possible to filter your products by its status. To do that click on *Filters*, select the related statuses, and click on *Close*



It is also possible to switch between the grid and tabular views using the related buttons



You can manage a specific acquired product clicking on it



In the displayed view, you can see the general info of the acquired product, and the characteristics and pricing you have selected.

The image displays two screenshots of a web application interface titled "My Inventory". The interface includes a sidebar with navigation links: Home, My inventory, My stock, Revenue Sharing, Products, and Product Orders. The top right corner shows a Shopping Cart icon and the user name "Pablo Nunez".

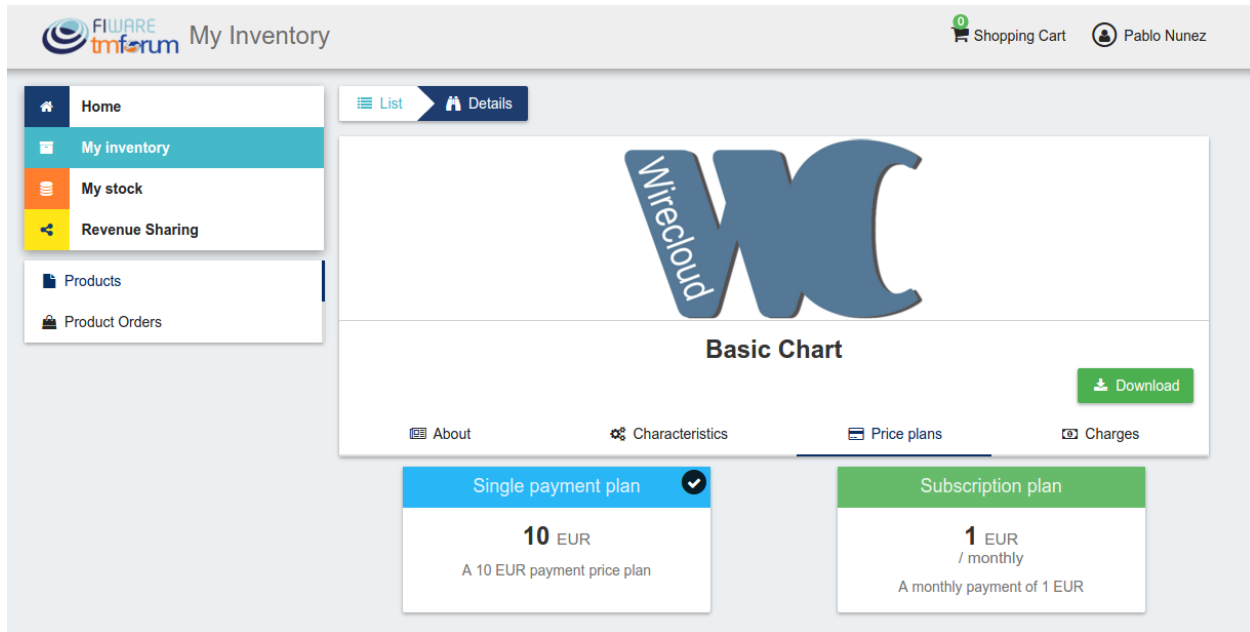
The main content area displays a "Basic Chart" for a "Wirecloud" component. The chart is represented by a large blue "WC" logo with "Wirecloud" written vertically. Below the logo, the title "Basic Chart" is shown, along with a "Download" button. Navigation tabs include "About", "Characteristics", "Price plans", and "Charges".

The top screenshot shows the "General" tab, which includes the following information:

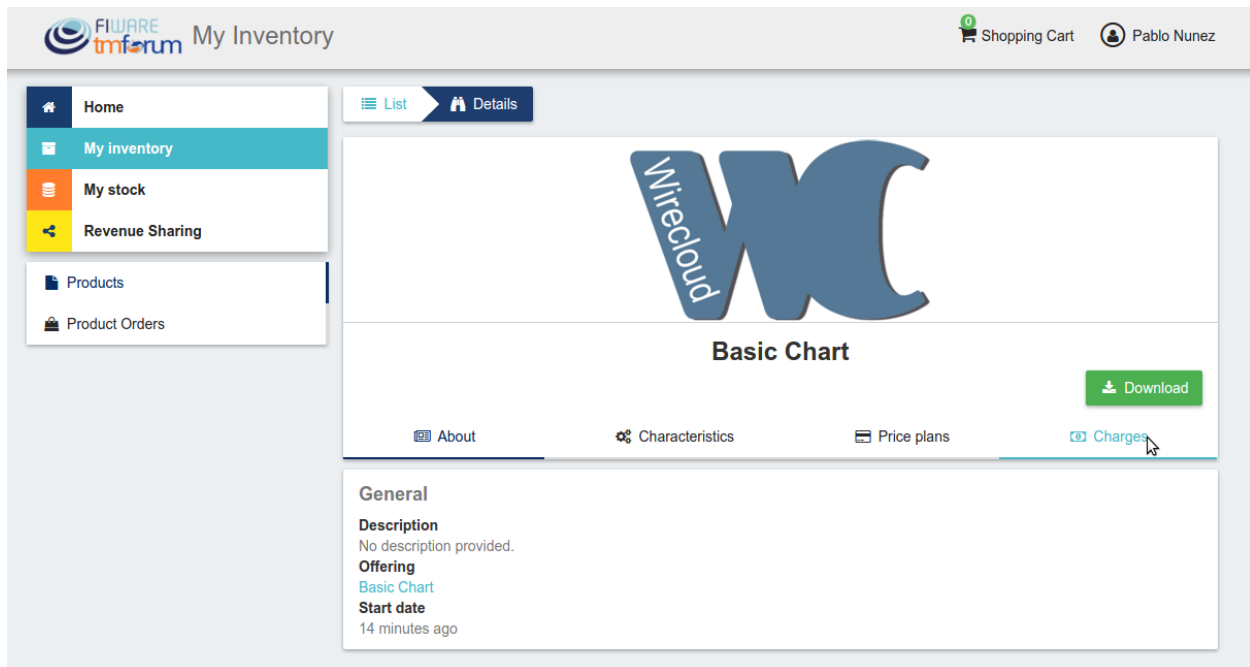
- Description:** No description provided.
- Offering:** Basic Chart
- Start date:** 9 minutes ago

The bottom screenshot shows the "Characteristics" tab, which includes the following information:

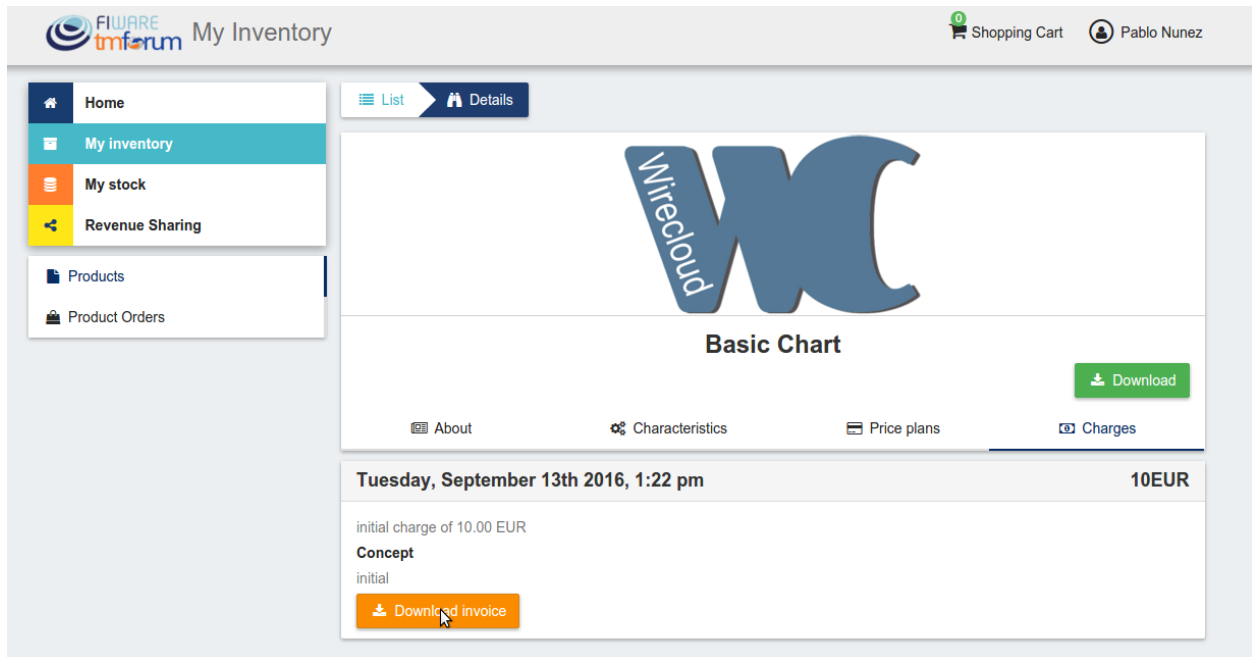
- Charts number:** The number of charts that can be included in the widget. Options: ☒ 5 charts, ☐ 10 charts.
- Asset type:** Type of the digital asset described in this product specification. Option: ☒ Wirecloud Component.
- Media type:** Media type of the digital asset described in this product specification. Option: ☒ widget.



Additionally, you can see your charges related to the product accessing to the *Charges* tab



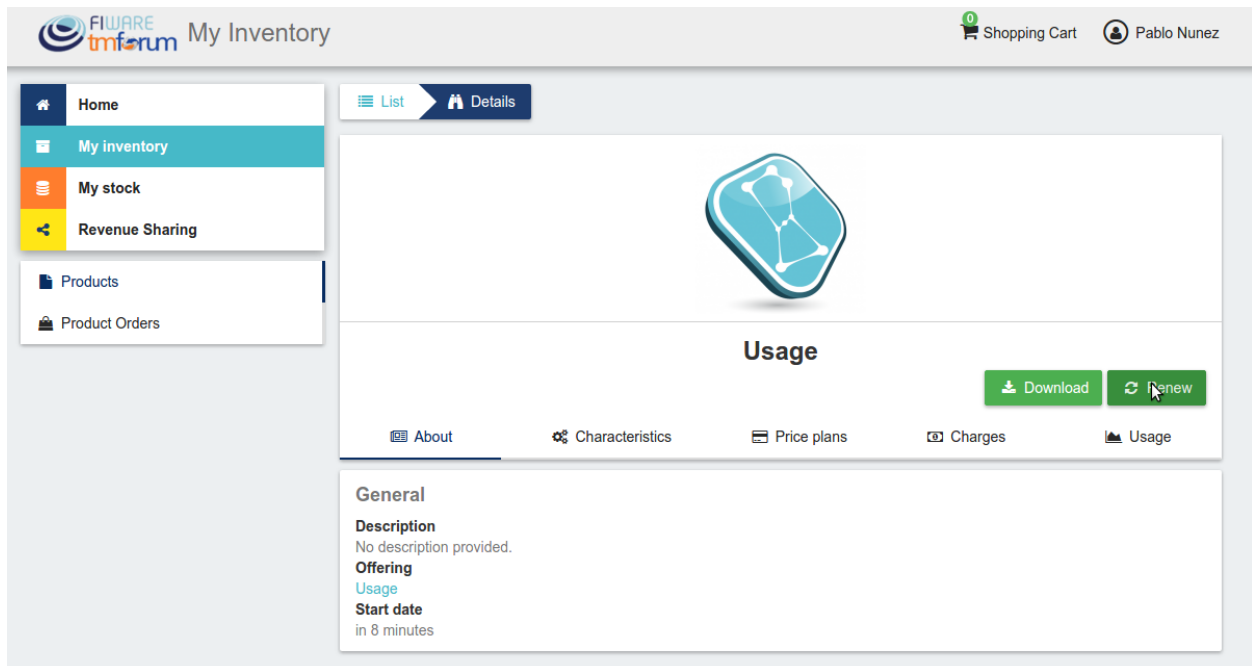
In this tab, you will find detailed information of the different charges and you will be able to download the related invoice clicking on *Download Invoice*



Moreover, this product view allows to download the related assets when the product is digital. To do that click on *Download*

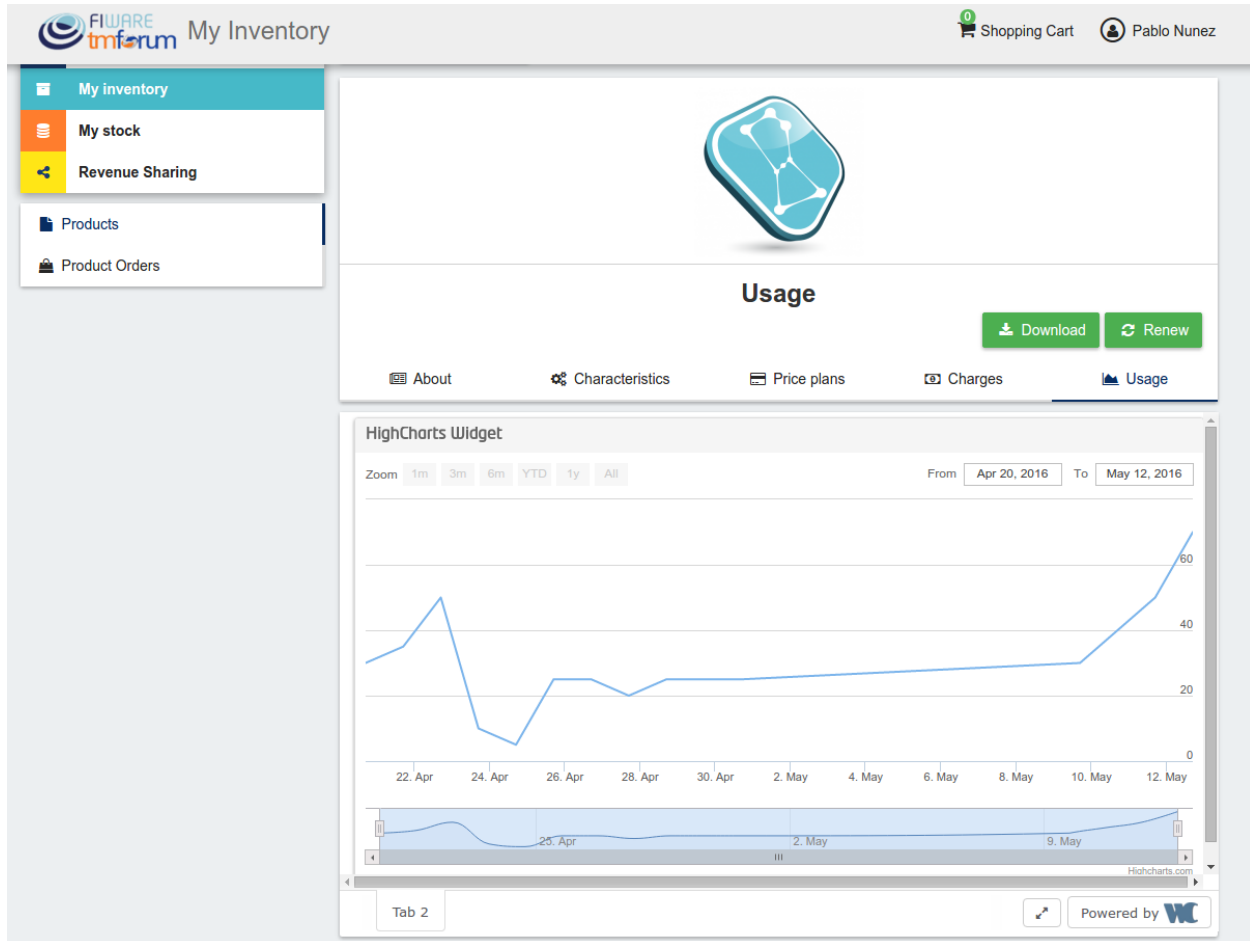
./images/user/inv12.png

In case the chosen pricing model defines a recurring payment or a usage payment, you will be able to renew your product clicking on *Renew*. After clicking, you will be redirected to PayPal to pay the related amount.



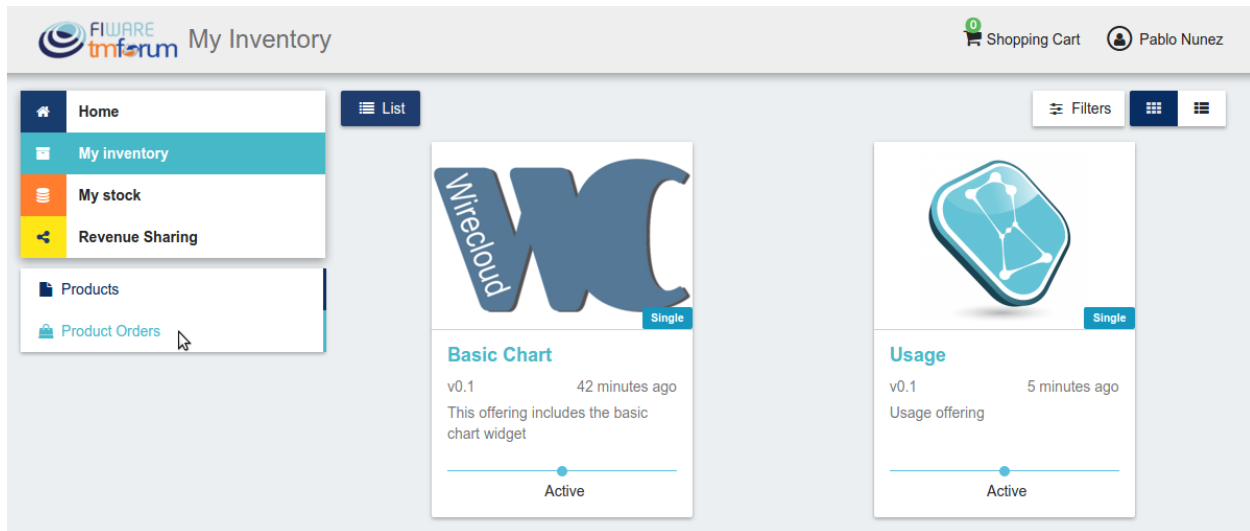
Note: If your product has expired and you do not renew it, it will be suspended, which means you will not have access to the acquired service until you pay

If the acquired product has a usage based price plan, you will be able to see your current consumption accessing the *Usage* tab

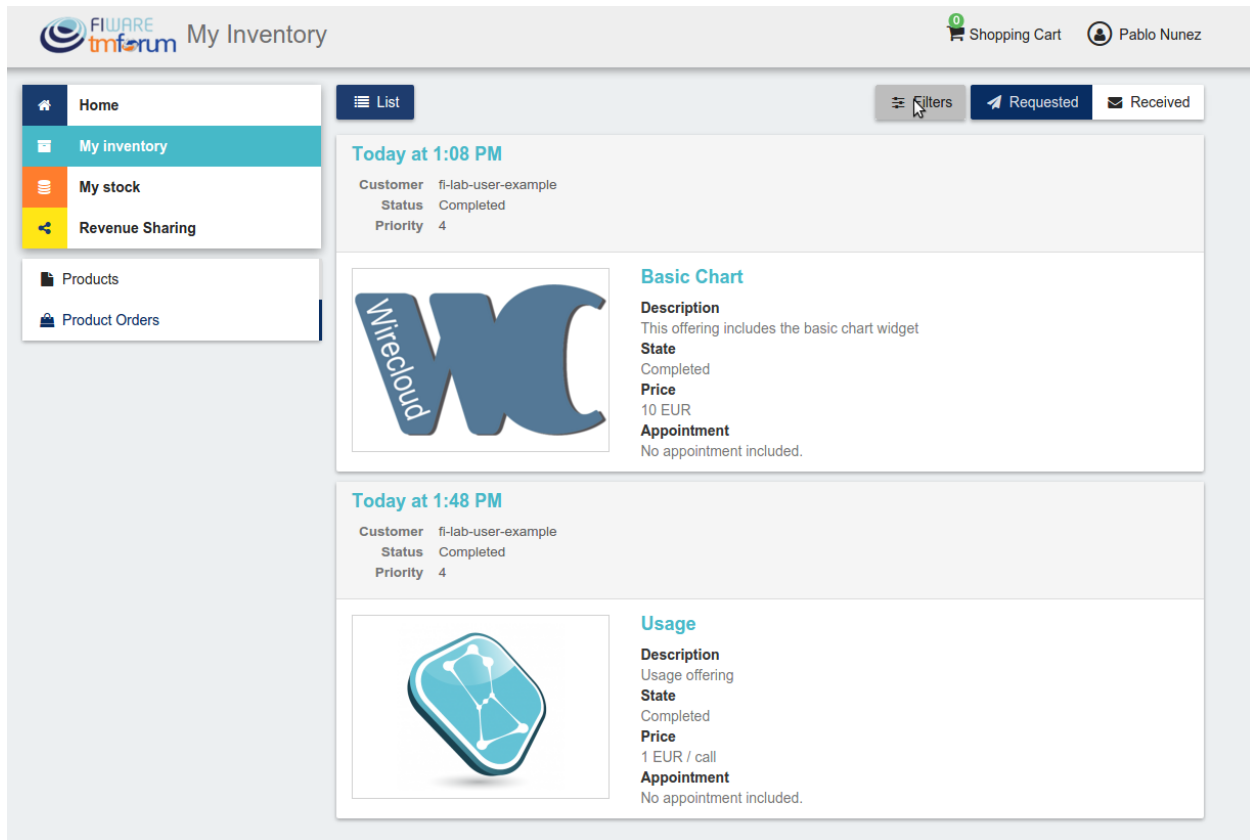


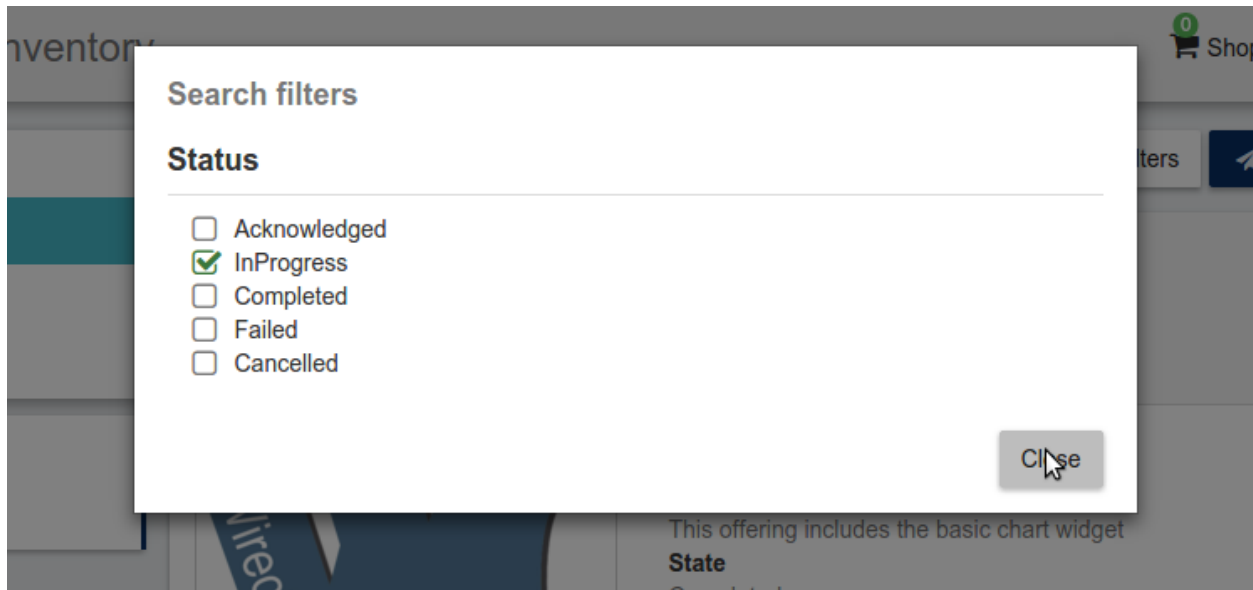
Manage Requested Orders

Customers can manage some aspects of the orders they have created. To see your requested orders, go to *My Inventory* and click on *Product Orders*

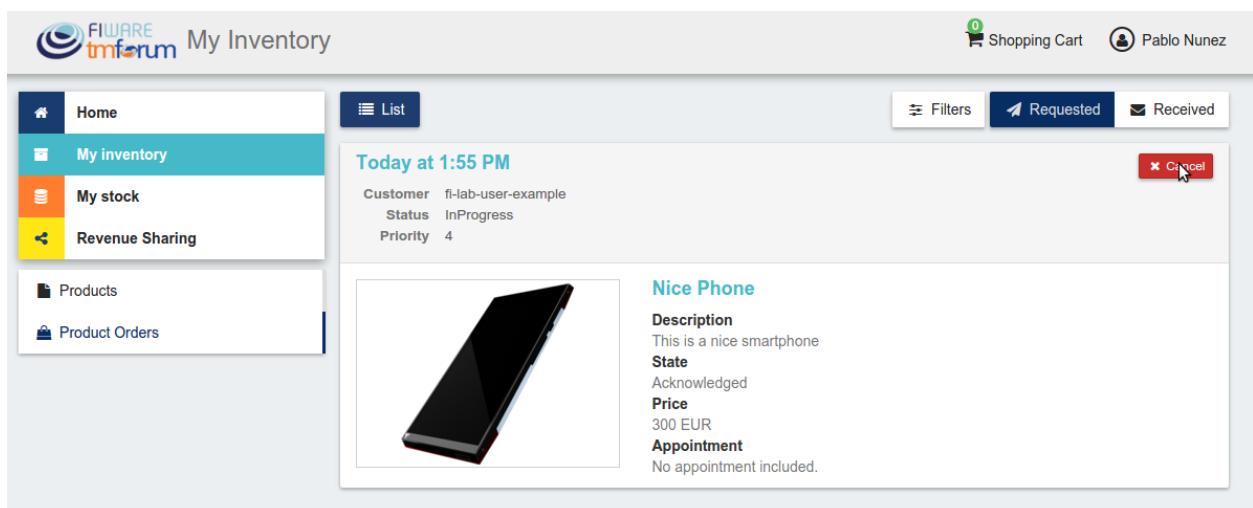


In the displayed view, you can see the orders you have created, which can be filtered by its status. To do that, click on *Filters*, select the wanted statuses, and click on *Close*





For those orders that include offerings of non digital products, you will be able to cancel them if the seller has not yet started the process. To do that, locate the order to be canceled and click on *Cancel*



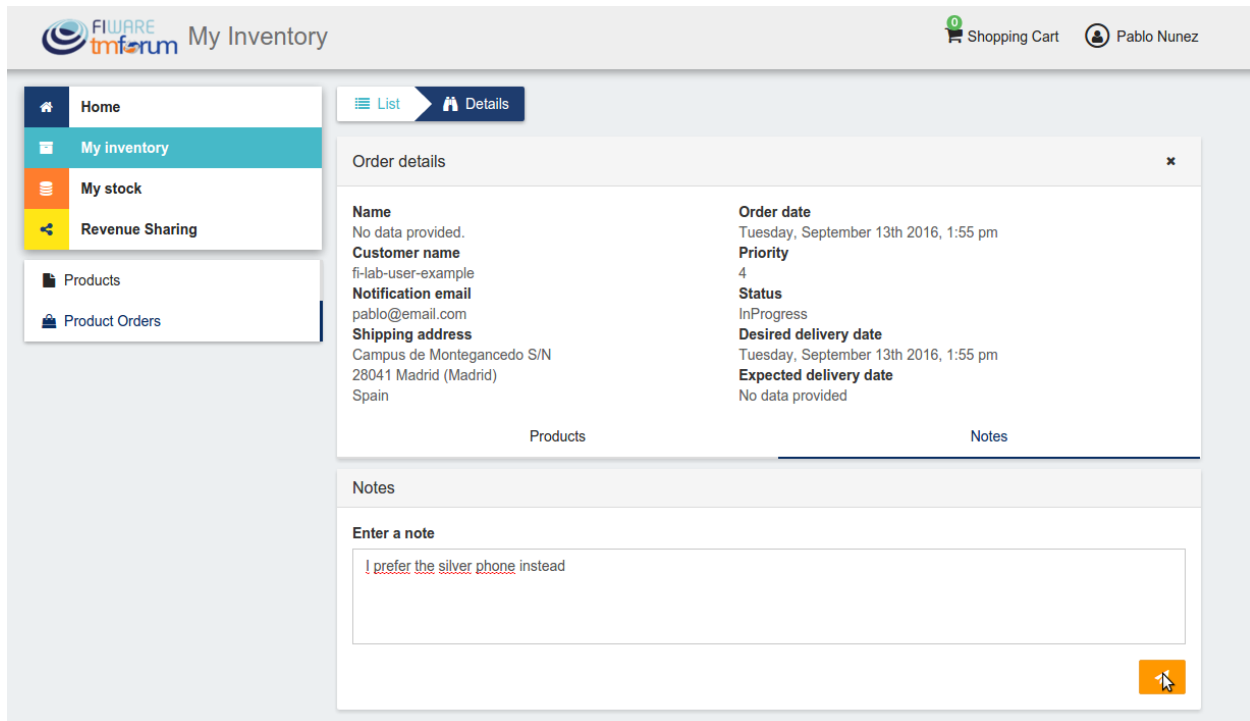
Moreover, you can review the details of the order. To do that click on the date of the order.

The screenshot shows the 'My Inventory' application interface. On the left is a sidebar with navigation links: Home, My inventory (selected), My stock, Revenue Sharing, Products, and Product Orders. The main content area displays a product detail for 'Nice Phone'. At the top, it shows 'Today at 1:55 PM' and a timestamp 'Tuesday, September 13th 2016, 1:55 pm'. Below this, the product status is 'InProgress' and the priority is '4'. A 'Cancel' button is visible in the top right corner. The product image is a black smartphone. To the right of the image, the product details are listed: Description ('This is a nice smartphone'), State ('Acknowledged'), Price ('300 EUR'), and Appointment ('No appointment included.').

In the displayed view, you can see all the details of the order, as well as the included products. In addition, you can leave a note for the seller in the *Notes* tab

The screenshot shows the 'My Inventory' application interface with the 'Order details' view selected. The sidebar is the same as in the previous screenshot. The main content area is titled 'Order details' and contains two columns of information. The left column lists: Name (No data provided), Customer name (fi-lab-user-example), Notification email (pablo@email.com), and Shipping address (Campus de Montegancedo S/N, 28041 Madrid (Madrid), Spain). The right column lists: Order date (Tuesday, September 13th 2016, 1:55 pm), Priority (4), Status (InProgress), Desired delivery date (Tuesday, September 13th 2016, 1:55 pm), and Expected delivery date (No data provided). Below the order details, there are two tabs: 'Products' (selected) and 'Notes'. The 'Products' tab shows 'Product 1' with an image of the smartphone and details: Offering (Nice Phone), Status (Acknowledged), Vendor name (fdelavega), Characteristics (Color: white), and Price (300 EUR).

To leave a note, write it in the provided text area and click on the send button



1.5 Programmer Guide

1.5.1 Plugin Package

Business API Ecosystem plugins must be packaged in a zip. This file will contain all the sources of the plugin and a configuration file called *package.json* in the root of the zip. This configuration file allows to specify some aspects of the behaviour of the plugin and contains the following fields:

- **name:** Name given to the resource type. This is the field that will be shown to providers
- **author:** Author of the plugin.
- **formats:** List that specify the different allowed formats for providing an asset of the given type. This list can contain the values “URL” and “FILE”.
- **module:** This field is used to specify the main class of the Plugin.
- **version:** Current version of the plugin.
- **media_types:** List of allowed media types that can be selected when providing an asset of the given type
- **pull_accounting (optional):** This flag is used to indicate that the service defined by the plugin is not pushing accounting information to the usage API of the Business API Ecosystem, but exposing an API that must be queried to retrieve this information.
- **form (optional):** This field is used to define a custom form that will be displayed for retrieving asset-specific meta data. This field is defined as an object where keys are the name of the metadata property and values define the following information:
 - **type:** Type of the particular metadata property. Allowed values are *text*, *textarea*, *checkbox* and *select* mapping the form input types to be displayed for retrieving the data.
 - **label:** Label to be displayed jointly with the form input.

- default: Default value to be used if no value provided for the property
- placeholder (text and textarea): Placeholder to be included within the form input
- options (select): List of valid options when the input is a select. It includes *text* and *value* for each entry.

Following you can find an example of a *package.json* file:

```
{
  "name": "Test Resource",
  "author": "fdelavega",
  "formats": ["FILE"],
  "module": "plugin.TestPlugin",
  "version": "1.0",
  "media_types": ["application/zip"],
  "form": {
    "auth_type": {
      "type": "select",
      "label": "Auth type",
      "options": [{
        "text": "OAuth2",
        "value": "oauth2"
      }, {
        "text": "API Key",
        "value": "key"
      }]
    },
    "token_required": {
      "type": "checkbox",
      "label": "Token required?",
      "default": true
    },
    "auth_server": {
      "type": "text",
      "label": "Auth Server",
      "placeholder": "https://authservice.com/auth"
    }
  }
}
```

The source code of the plugin must be written in Python and must contain a main class that must be a child class of the Plugin class defined in the Charging Backend of the Business API Ecosystem. Following you can find an example of a plugin main class.

```
from wstore.asset_manager.resource_plugins.plugin import Plugin

class TestPlugin(Plugin):
    def on_pre_product_spec_validation(self, provider, asset_t, media_type, url):
        pass

    def on_post_product_spec_validation(self, provider, asset):
        pass

    def on_pre_product_spec_attachment(self, asset, asset_t, product_spec):
        pass

    def on_post_product_spec_attachment(self, asset, asset_t, product_spec):
        pass
```

(continues on next page)

(continued from previous page)

```
def on_pre_product_spec_upgrade(self, asset, asset_t, product_spec):
    pass

def on_post_product_spec_upgrade(self, asset, asset_t, product_spec):
    pass

def on_pre_product_offering_validation(self, asset, product_offering):
    pass

def on_post_product_offering_validation(self, asset, product_offering):
    pass

def on_product_acquisition(self, asset, contract, order):
    pass

def on_product_suspension(self, asset, contract, order):
    pass

def get_usage_specs(self):
    return []

def get_pending_accounting(self, asset, contract, order):
    return [], Date()
```

1.5.2 Implementing Event Handlers

It can be seen in the previous section that the main class of a plugin can implement some methods that are inherited from the Charging Backend Plugin class. These methods can be used to implement handlers of the different events of the life cycle of a product containing the asset. Concretely, the following events have been defined:

- **on_pre_product_spec_validation:** This method is executed when creating a new digital product containing an asset of the given type, before validating the product spec contents and saving the asset info in the database. This method can be used for validating the asset format or the seller permissions to sell the asset.
- **on_post_product_spec_validation:** This method is executed when creating a new digital product containing an asset of the given type, after validating the product spec and saving the asset info in the database. This method can be used if the plugin requires to know some specific info of the asset model.
- **on_pre_product_spec_attachment:** This method is executed when creating a new digital product containing an asset of the given type, after saving the product spec in the catalog API database but before attaching the product spec id to the asset model. This method can be used if the plugin requires to know the id in the catalog of the product spec.
- **on_post_product_spec_attachment:** This method is executed when creating a new digital product containing an asset of the given type, after saving the product spec in the catalog API database and after attaching the product spec id to the asset model. This method can be used if the plugin requires to know the id in the catalog of the product spec.
- **on_pre_product_spec_upgrade:** This method is executed when a digital product is being upgraded (a new version of the asset has been provided). This method can be used in order to validate the new digital asset before saving the upgrade.
- **on_post_product_spec_upgrade:** This method is executed when a digital product has been upgraded. This method can be used to send notifications or retrieve new information of the product specification.
- **on_pre_product_offering_validation:** This method is executed when creating a new product offering containing an asset of the given type, before validating its pricing model. This method can be used to make extra

validations on the pricing model, for example check if the unit of an usage model is supported by the given asset

- **on_post_product_offering_validation:** This method is executed when creating a new product offering containing an asset of the given type, after validating its pricing model. This method can be used to make extra validations on the pricing model, for example check if the unit of an usage model is supported by the given asset
- **on_product_acquisition:** This method is called when a product containing an asset of the given type has been acquired. This method can be used to activate the service for the customer and give him access rights.
- **on_product_suspension:** This method is called when a product containing an asset of the given type has been suspended for a customer (e.g he has not paid). This method can be used to suspend the service for the customer and remove his access rights
- **get_usage_specs:** This method must be implemented when the flag *pull_accounting* is set to true and must return the list of usage specifications the service is able to monitor. For each usage specification a *name* and a *description* must be provided (e.g name: API Call, description: Number of calls made to. . .)
- **get_pending_accounting:** This method must be implemented when the flag *pull_accounting* is set to true. This method must implement the client able to access to the service the plugin is defining in order to retrieve pending accounting information for a giving contract. It must return the list of pending accounting including:
 - *date*: Timestamp of the accounting record
 - *unit*: Monitored unit
 - *value*: Actual usage made by the customer

As can be seen in the Plugin example, the different handler methods receive some parameters with relevant information and objects. In particular:

on_pre_product_spec_validation

- **provider:** User object containing the user who is creating the product specification (The User object is described later)
- **asset_t:** String containing the asset type, it must be equal to the one defined in package.json
- **media_type:** String containing the media type of the asset included in the product being created
- **url:** String containing the url of the asset included in the product being created

on_post_product_spec_validation

- **provider:** User object containing the user who is creating the product specification (The User object is described later)
- **asset:** Asset object with the recently created asset (The Asset object is described later)

on_pre_product_spec_attachment

- **asset:** Asset object where the created product specification id is going to be attached
- **asset_t:** String containing the asset type, it must be equal to the one defined in package.json
- **product_spec:** JSON with the raw product specification information that is going to be used for the attachment. (The structure of this JSON object can be found in the Open Api documentation)

on_post_product_spec_attachment

- **asset:** Asset object where the created product specification id has been attached
- **asset_t:** String containing the asset type, it must be equal to the one defined in package.json
- **product_spec:** JSON with the raw product specification information that has been used for the attachment. (The structure of this JSON object can be found in the Open Api documentation)

on_pre_product_spec_upgrade

- **asset:** Asset object that have been upgraded
- **asset_t:** String containing the asset type, it must be equal to the one defined in package.json
- **product_spec:** JSON with the raw product specification information that is going to be used for the upgrade. (The structure of this JSON object can be found in the Open Api documentation)

on_post_product_spec_upgrade

- **asset:** Asset object that have been upgraded
- **asset_t:** String containing the asset type, it must be equal to the one defined in package.json
- **product_spec:** JSON with the raw product specification information that has been used for the upgrade. (The structure of this JSON object can be found in the Open Api documentation)

on_pre_product_offering_validation

- **asset:** Asset object included in the offering being created
- **product_offering:** JSON with the raw product offering information that is going to be validated. (The structure of this JSON object can be found in the Open Api documentation)

on_post_product_offering_validation

- **asset:** Asset object included in the offering being created
- **product_offering:** JSON with the raw product offering information that has been validated. (The structure of this JSON object can be found in the Open Api documentation)

on_product_acquisition

- **asset:** Asset object that has been acquired
- **contract:** Contract object including the information of the acquired offering which contains the asset. (The Contract object is described later)
- **order:** Order object including the information of the order where the asset was acquired. (The Order object is described later)

on_product_suspension

- **asset:** Asset object that has been suspended
- **contract:** Contract object including the information of the acquired offering which contains the asset
- **order:** Order object including the information of the order where the asset was acquired

get_pending_accounting

- **asset:** Asset object whose usage information has to be retrieved
- **contract:** Contract object including the information of the acquired offering which contains the asset
- **order:** Order object including the information of the order where the asset was acquired

Handler Objects

Following you can find the information regarding the different objects used in plugin handlers

- **User: Django model object with the following fields**
 - **username:** Username of the user
 - **email:** Email of the user
 - **complete_name:** Complete name of the user
- **Asset: Django model object with the following fields**
 - **product_id:** Id of the product specification which includes the asset
 - **version:** Version of the product specification which includes the asset
 - **provider:** User object of the user that created the asset
 - **content_type:** media type of the asset
 - **download_link:** URL of the asset if it is a service in an external server
 - **resource_path:** Path to the asset file if it is uploaded in the server
 - **resource_type:** Type of the asset as defined in the package.json file of the related plug-in
 - **is_public:** If true the asset can be downloaded by any user without the need of acquiring it
 - **meta_info:** JSON with any related information. This field is useful to include specific info from the plugin code

Additionally, it includes the following methods:

- **get_url:** Returns the URL where the asset can be accessed
- **get_uri:** Returns the url where the asset info can be accessed
- **Contract: Django model with the following fields**
 - **item_id:** Id of the order item which generated the current contract
 - **offering:** Offering object with the information of the offering acquired in the current contract (The offering object is described later)
 - **product_id:** Id of the inventory product created as a result if the acquisition of the specified offering

- **pricing_model**: JSON with the pricing model that is used in the current contract for charging the customer who acquired the included offering
- **last_charge**: Datetime object with the date and time of the last charge to the customer
- **charges**: List of Charge objects containing the info of the different times the customer has been charged in the context of the current contract
- **correlation_number**: Next expected correlation number for usage documents. This field is only used when the pricing model is usage
- **last_usage**: Datetime object with the date and time of the last usage document received. This field is only used when the pricing model is usage
- **revenue_class**: Product class of the involved offering for revenue sharing
- **terminated**: Specified whether the contract has been terminated (the customer has no longer access to the acquired asset)
- **Offering: Django model with the following fields**
 - **off_id**: Id of the product offering
 - **name**: Name of the offering
 - **version**: Version of the offering
 - **description**: Description of the offering
 - **asset**: Asset offered in the offering
- **Charge Django model with the following fields**
 - **date**: Datetime object with the date and time of the charge
 - **cost**: Total amount charged
 - **duty_free**: Amount charged without taxes
 - **currency**: Currency of the charge
 - **concept**: Concept of the charge (initial, renovation, usage)
 - **invoice**: Path to the PDF file containing the invoice of the charge
- **Order: Django model with the following fields**
 - **order_id**: Id of the product order
 - **customer**: User object of the customer of the order
 - **date**: Datetime object with the date and time of the order creation
 - **tax_address**: JSON with the billing address used by the customer in the order
 - **contracts**: List of Contract objects, one for each offering acquired in the order

Additionally, it includes the following methods:

- **get_item_contract**: Returns a contract given an item_id
- **get_product_contract**: Returns a contract given a product_id

1.5.3 Managing Plugins

Once the plugin has been packaged in a zip file, the Charging Backend of the Business API Ecosystem offers some management command that can be used to manage the plugins.

When a new plugin is registered, The Business API Ecosystem automatically generates an id for the plugin that is used for managing it. To register a new plugin the following command is used:

```
python manage.py loadplugin TestPlugin.zip
```

It is also possible to list the existing plugins in order to retrieve the generated ids:

```
python manage.py listplugins
```

To remove a plugin it is needed to provide the plugin id. This can be done using the following command:

```
python manage.py removeplugin test-plugin
```

1.6 Plugins Guide

This plugins guide covers the available plugins (defining digital asset types) for the Business API Ecosystem v7.8.0

1.6.1 Installing Asset Plugins

The Business API Ecosystem is intended to support the monetization of different kind of digital assets. The different kind of assets that may be wanted to be monetized will be heterogeneous and potentially very different between them.

Additionally, for each type of asset different validations and activation mechanisms will be required. For example, if the asset is a CKAN dataset, it will be required to validate that the provider is the owner of the dataset. Moreover, when a customer acquires the dataset, it will be required to notify CKAN that a new user has access to it.

The huge differences between the different types of assets that can be monetized in the Business API Ecosystem makes impossible to include its validations and characteristics as part of the core software. For this reason, it has been created a plugin based solution, where all the characteristics of an asset type are implemented in a plugin that can be loaded in the Business API Ecosystem.

To include an asset plugin execute the following command in the Charging Backend:

```
$ ./manage.py loadplugin ckandataset.zip
```

It is possible to list the existing plugins with the following command:

```
$ ./manage.py listplugins
```

To remove an asset plugin, execute the following command providing the plugin id given by the *listplugins* command

```
$ ./manage.py removeplugin ckan-dataset
```

Note: For specific details on how to create a plugin and its internal structure, have a look at the Business API Ecosystem Programmer Guide

At the time of writing, the following plugins are available:

- **Basic File:** Allows the creation of products by providing files as digital assets. No validations or processing is done
- **Basic URL:** Allows the creation of products by providing URLs as digital assets. No validations or processing is done
- **CKAN Dataset :** Allows the monetization of CKAN datasets
- **CKAN API Dataset** Allows the monetization of CKAN datasets whose resources are served by an external APIs (e.g NGSi Queries) secured with **API Umbrella**.
- **Umbrella Service** Allows the monetization of services secured by API Umbrella with FIWARE IDM users and roles.
- **WireCloud Component:** Allows the monetization of WireCloud components, including Widgets, operators, and mashups
- **Accountable Service :** Allows the monetization of services protected by the **Accounting Proxy**, including Orion Context Broker queries

1.6.2 Available Plugins

Basic File and Basic URL

The *Basic File* and *Basic URL* plugins are available at [GitHub](#). These plugins are intended to enable the creation of digital products in the Business API Ecosystem without the need of specifying a particular type or validation process. In this regard, these plugins allow the publication of any file or any URL as digital asset respectively, and can be used for the creation of simple file catalogs or for testing the Business API Ecosystem.

These plugins do not implement any event handler.

CKAN Dataset and CKAN API Dataset

The *CKAN Dataset* and *CKAN API Dataset* plugins are available in [GitHub](#). These plugins define an asset type intended to manage and monetize datasets offered in a CKAN instance. In particular, these plugins are able to validate the dataset, validate the rights of the seller creating a product specification to sell the provided dataset, and manage the access to the dataset of those customers who acquire it.

The difference between both plugins is the type of data included as a resource in the CKAN dataset. In particular, *CKAN API Dataset* expects the data to be served by an external API secured with the FIWARE security framework. In this regard, the *CKAN API Dataset* also validates the permissions of the seller in the data service and grants customers access to it using the FIWARE IdM roles and permissions.

Is important to notice that by default CKAN does not provide a mechanism to publish protected datasets or an API for managing the access rights to the published datasets. In this regard, the CKAN instance to be monetized has to be extended with the following CKAN plugins:

- **ckanext-oauth2:** This extension allows to use an external OAuth2 Identity Manager for managing CKAN users. In particular, this extension must be used, in this context, to authenticate users using the same FIWARE IdM instance as the specific Business API Ecosystem instance, so both systems (CKAN and Business API Ecosystem) share their users.
- **ckanext-privatedatasets:** This extension allows to create protected datasets in CKAN which can only be accessed by a set of users selected by the dataset owner. Moreover, this extension exposes an API that can be used to add or remove authorized users from a dataset.

In addition, if the `ckanext-storepublisher` plugin is installed in CKAN, the *CKAN dataset* or *CKAN API Dataset* plugin must be installed in the Business API Ecosystem, since the aforementioned CKAN extension uses the *CKAN Dataset* or *CKAN API Dataset* asset type (depending on the dataset resource) for creating product specifications.

The *CKAN Dataset* plugin only allows to provide the asset with a URL that must match the dataset URL in CKAN.

This plugin implements the following event handlers:

- **on_pre_product_spec_validation:** In this handler the plugin validates that the provided URL is a valid CKAN dataset and that the user creating the product specification is its owner.
- **on_product_acquisition:** In this handler the plugin uses the CKAN instance API in order to grant access to the user who has acquired a dataset.
- **on_product_suspension:** In this handler the plugin uses the CKAN instance API in order to revoke access to a dataset when a user has not paid or when the user cancels a subscription.

On the other hand, the *CKAN API Dataset* also requires an *Acquisition role* to be provided. This role is the one that will be granted to customers in the IdM in order to enable their access to the backend service, so the role must exist and define a proper set of permissions for accessing the data.

New product

1 General

2 Bundle

3 Assets

4 Characteristics

5 Attachments

6 Relationships

7 Terms & Conditions

8 Finish

Step 3: Assets

Is a digital product? ☒

Digital Asset Type: CKAN API Dataset

How to provide?: URL

Asset URL: <https://data.lab.fiware.org/dataset/air-quality-madrid>

Media Type: fiware-ngsi

Acquisition Role: air_customer

Next

This plugin implements the following event handlers:

- **on_pre_product_spec_validation:** In this handler the plugin validates that the provided URL is a valid CKAN dataset and that the user creating the product specification is its owner.
- **on_post_product_spec_validation:** In this handler, the plugin validates that the API resources included in the CKAN dataset are valid, the permissions of the seller to offer that services, and that the provided acquisition role exist and is valid.
- **on_post_product_offering_validation:** In this handler the plugin validates that pricing models are supported when creating a pay-per-use offering
- **on_product_acquisition:** In this handler the plugin uses the CKAN instance API in order to grant access to the user who has acquired a dataset.
- **on_product_suspension:** In this handler the plugin uses the CKAN instance API in order to revoke access to a dataset when a user has not paid or when the user cancels a subscription.
- **get_pending_accounting:** In this handler, the plugins retrieves pending accounting information when the access to the data has been acquired under a pay-per-use pricing model.

In addition, the *CKAN API Dataset* requires some settings to be configured before being deployed. This settings are available in the *setting.py* file, and are:

- **UMBRELLA_SERVER:** Administration endpoint of the API Umbrella instance used to secure backend services
- **UMBRELLA_KEY:** API Key used for accessing to the API Umbrella instance used to secure the backend service
- **UMBRELLA_ADMIN_TOKEN:** Admin token used for accessing to the API Umbrella instance used to secure the backend service
- **KEYSTONE_USER:** Keystone user used for authenticate requests to the FIWARE IdM
- **KEYSTONE_PASSWORD:** Keystone password used for authenticate requests to the FIWARE IdM

- **KEYSTONE_HOST**: Host of the Keystone service of the FIWARE IdM used for authorizing customers
- **IS_LEGACY_IDM**: False if the FIWARE Idm is at least v7.0.0
- **CKAN_TOKEN_TYPE**: Whether CKAN has to be accessed using X-Auth-Token or Authorization headers

In addition, these settings can be configured using environment variables:

- BAE_ASSET_UMBRELLA_SERVER
- BAE_ASSET_UMBRELLA_KEY
- BAE_ASSET_UMBRELLA_TOKEN
- BAE_ASSET_IDM_USER
- BAE_ASSET_IDM_PASSWORD
- BAE_ASSET_IDM_HOST
- BAE_ASSET_LEGACY_IDM
- BAE_ASSET_TOKEN_TYPE

Umbrella Service

The *Umbrella Service* plugin is available in [GitHub](#). This plugin defines an asset type intended to manage and monetize any HTTP service secured with the combination of a FIWARE IDM for users and roles management and API Umbrella as PEP proxy.

The Umbrella Service plugin allows to provide services in different ways using the options it defined in its metadata form, which can be selected by sellers when registering the product. In particular:

- **Authorization Method**: Whether user access to backend service is controlled using FIWARE IDM roles or API Umbrella native roles
- **Acquisition Role**: Role to be granted to customers
- **Access to sub-paths allowed**: If true, customers will be able to access to any sub-path of the monetized service
- **Additional query strings allowed**: If true, customers will be able to call the service with different query strings as the included in the asset URL
- **Admin API Key**: API key to be used by the BAE to access to the API Umbrella admin API
- **Admin Auth Token**: Admin token to be used by the BAE to access to the Umbrella admin API

Moreover, this plugin support pay-per-use pricing supporting the *api call* unit. The accounting information is retrieved from the API Umbrella logging API using the service details provided as metadata when the product is created.

This plugin implements the following event handlers:

- **on_post_product_spec_validation**: In this event handler the plugin validates all the provided information, including URL, Umbrella credentials and role.
- **on_post_product_offering_validation**: In this event handler the plugin validates that the provided pricing model is supported by the plugin (Usage model)
- **on_product_acquisition**: In this event handler the plugin grants access to the customer using the provided role
- **on_product_suspension**: In this event handler the plugin revokes access to the customer removing the provided role
- **get_pending_accounting**: In this event handler the plugin accesses Umbrella API to retrieve the pending accounting information

WireCloud Component

The *WireCloud Component* plugin is available in [GitHub](#). This plugin defines an asset type intended to manage and monetize the different WireCloud components (Widgets, Operators, and Mashups) in particular by enabling the creation of product specifications providing the WGT file of the specific component. (For more details on the WireCloud platform see its documentation in [ReadTheDocs](#))

The WireCloud component plugin allows to provide the WGT file in the two ways supported by the Business API Ecosystem, that is, uploading the WGT file when creating the product and providing a URL where the platform can download the file.

In addition, the plugin only allows the media type *Mashable application component*. Nevertheless, the plugin code uses the WGT metainfo to determine the type of the WireCloud component (Widget, Operator, or Mashup) and overrides the media type with the proper one understood by the WireCloud platform (*wirecloud/widget*, *wirecloud/operator* or *wirecloud/mashup*).

FIWARE **My Stock** Shopping Cart fdelavega

Home My inventory **My stock** Revenue Sharing Catalogs Product Specifications Offerings

List New

New product

1 General 2 Bundle **3 Assets** 4 Characteristics 5 Attachments 6 Relationships 7 Terms & Conditions 8 Finish

Step 3: Assets

Is a digital product? ☒

Digital Asset Type: WireCloud Component How to provide?: FILE

Asset File: Ningún archivo seleccionado

Media Type: Mashable application component

Next

FIWARE **My Stock** Shopping Cart fdelavega

Home My inventory **My stock** Revenue Sharing Catalogs Product Specifications Offerings

List New

New product

1 General 2 Bundle **3 Assets** 4 Characteristics 5 Attachments 6 Relationships 7 Terms & Conditions 8 Finish

Step 3: Assets

Is a digital product? ☒

Digital Asset Type: WireCloud Component How to provide?: URL

Asset URL:

Media Type: Mashable application component

Next

This plugin implements the following event handlers:

- **on_post_product_spec_validation:** In this handler the plugin validates the WGT file to ensure that it is a valid WireCloud Component
- **on_post_product_spec_attachment:** In this handler the plugin determines the media type of the WGT file and overrides the media type value in the specific product specification

Accountable Service

Warning: This plugin is deprecated, and will not evolve. This plugin has been replaced by Umbrella Service Plugin

The *Accountable Service* plugin is available in [GitHub](#). This plugin defines a generic asset type which is used jointly with the *Accounting Proxy* in order to offer services under a pay-per-use model. In particular, this plugin is able to validate services URLs, validate sellers permissions, generate API keys for the Accounting Proxy, validate offering pricing models, and manage customers access rights to the offered services.

Taking into account that this plugin is intended to work coordinately with an instance of the Accounting Proxy, all the assets to be registered using the *Accountable Service* type must be registered in the proxy as described in the Accounting Proxy section.

The *Accountable Service* plugin only allows to provide the assets with a URL that must match the service one.

This plugin implements the following event handlers:

- **on_post_product_spec_validation:** In this event handler the plugin validates that the provided URL belongs to a valid service registered in an instance of the Accounting Proxy, and that the user creating the product specification is its owner. In addition, this handler generates an API key for the Accounting Proxy to be used when it feeds the Business API Ecosystem with accounting information.
- **on_post_product_offering_validation:** In this event handler the plugin validates the pricing model of a product offering where the service is going to be sold. Specifically, it validates that all the price plans which can be selected by a customer are usage models and that the units (calls, seconds, mb, etc) are supported by the Accounting Proxy.
- **on_product_acquisition:** This event handler is used to grant access to a user who has acquired a service by sending a notification to the proxy, including also the unit to be accounted (price plan selected).

- **on_product_suspension:** This event handler is used to in order to revoke access to a service when a user has not paid or when the user cancels a subscription.

Accounting Proxy

The *Accounting Proxy* can be found in [GitHub](#). This software is a NodeJs server intended to manage services offered in the Business API Ecosystem. In particular, it is able to authenticate users, authorize or deny users to access to a particular service depending on the acquisition, the URL, or the HTTP method used, and account the usage made of the service so users can be charged on pay-per-use basis.

Having this software deployed allows service owners to protect their services and offer them in the Business API Ecosystem without the need of making any modification in the specific service.

Installation

This software is a pure NodeJS server, to install basic dependencies execute the following command:

```
$ npm install
```

Configuration

All the Accounting Proxy configuration is saved in the *config.js* file in the root of the project.

In order to have the accounting proxy running it is needed to fill the following information:

- **config.accounting_proxy: Basic information of the accounting deployment.**
 - **https:** set this variable to undefined to start the service over HTTP.
 - * *enabled:* set this option to true to start the service over HTTPS and activate the certificate validation for some administration requests (see *Proxy API*).
 - * *certFile:* path to the server certificate in PEM format.
 - * *keyFile:* path to the private key of the server.
 - * *caFile:* path to the CA file.
 - **port:** port where the accounting proxy server is listening.

```
{
  https: {
    enabled: true,
    certFile: 'ssl/server1.pem',
    keyFile: 'ssl/server1.key',
    caFile: 'ssl/fake_ca.pem'
  },
  port: 9000
}
```

- **config.database: Database configuration used by the proxy.**
 - *type:* database type. Two possible options: *./db* (sqlite database) or *./db_Redis* (redis database).
 - *name:* database name. If the database type select is redis, then this field selects the database number (0 to 14; 15 is reserved for testing).
 - *redis_host:* redis database host.

- *redis_port*: redis database port.

```
{
  type: './db',
  name: 'accountingDB.sqlite',
  redis_host: 'localhost',
  redis_port: 6379
}
```

- ***config.modules***: An array of supported accounting modules for accounting in different ways. Possible options are:

- *call*: the accounting is incremented in one unit each time the user send a request.
- *megabyte*: counts the response amount of data (in megabytes).
- *millisecond*: counts the request duration (in milliseconds).

```
{
  accounting: [ 'call', 'megabyte', 'millisecond' ]
}
```

Other accounting modules can be implemented and included to the proxy (see *Accounting modules*).

- ***config.usageAPI***: the information of the usage management API where the usage specifications and the accounting information are managed.

**host*: Business API Ecosystem host. **port*: Business API Ecosystem port. **path*: path of the usage management API. **schedule*: defines the daemon service schedule to notify the accounting information to the Business API Ecosystem. The format is similar to the cron tab format: “MINUTE HOUR DAY_OF_MONTH MONTH_OF_YEAR DAY_OF_WEEK YEAR (optional)”. By the default, the usage notifications will be sent every day at 00:00.

```
{
  host: 'localhost',
  port: 8080,
  path: '/DSUsageManagement/api/usageManagement/v2',
  schedule: '00 00 * * *'
}
```

- ***config.api.administration_paths***: configuration of the administration paths. Default accounting paths are:

```
{
  api: {
    administration_paths: {
      keys: '/accounting_proxy/keys',
      units: '/accounting_proxy/units',
      newBuy: '/accounting_proxy/newBuy',
      checkURL: '/accounting_proxy/urls',
      deleteBuy: '/accounting_proxy/deleteBuy'
    }
  }
}
```

The Accounting Proxy can be used to proxy an Orion Context Broker, supporting the accounting of subscriptions. To do that, the following configuration params are used:

- ***config.resources***: configuration of the resources accounted by the proxy.

- *contextBroker*: set this option to *true* if the resource accounted is an Orion Context Broker. Otherwise set this option to *false* (default value).

- *notification_port*: port where the accounting proxy is listening to subscription notifications from the Orion Context Broker (port 9002 by default).

```
{  
    contextBroker: true,  
    notification_port: 9002  
}
```

Administration

The Accounting Proxy is able to manage multiple services. In this regard, it has been provided a *cli* tool that can be used by admins in order to register, delete, and manage its services. The available commands are:

- *.cli addService [-c | -context-broker] <publicPath> <url> <appId> <httpMethod> [otherHttpMethods...]*: This command is used to register a new service in the Accounting Proxy. It receives the following parameters

- *publicPath*: Path where the service will be made available to external users. There are two valid patterns for the public path: (1) Providing a path with a single component (*/publicpath*) will make the Accounting Proxy accept requests to sub-paths of the specified one (i.e having a public path */publicpath* requests to */publicpath/more/path* are accepted). This pattern is typically used when you are offering the access to an API with multiple resources. (2) Providing a complete path (*/this/is/the/final/resource/path?color=Blue&shape=rectangular*) will make the Accounting Proxy to accept only requests to the exact registered path including query strings. This pattern is typically used when you are offering a single URL, like a Context Broker query.
- *url*: URL where your service is actually running and where requests to the proxy will be redirected. Note that in this case all the URL is provided (including the host) since the accounting proxy allows the management of services running in different servers.
- *appId*: ID of the service given by the FIWARE IdM. This id is used in order to ensure that the access tokens provided by users are valid for the accessed service
- *HTTP methods*: List of HTTP methods that are allowed to access to the registered service
- **Options:**

- * *-c, -context-broker*: the service is an Orion Context broker service (*config.contextBroker* must be set to *true* in *config.js*).

Following you can find two examples in order to clarify the options available for registering a service:

```
$ ./cli addService /apacheapp http://localhost:5000/ 1111 GET PUT POST
```

In this case, there is a service running in the port 5000 which is made available though the */apacheapp* path, allowing only GET, PUT, and POST HTTP request. Supposing that the Accounting Proxy is running in the host *accounting.proxy.com* in the port 8000, the following requests will be accepted by it:

```
GET http://accounting.proxy.com:8000/apacheapp  
GET http://accounting.proxy.com:8000/apacheapp/resource1/  
POST http://accounting.proxy.com:8000/apacheapp/resource1/resource2
```

Note: The Accounting Proxy does not care about the API or the semantics of the monitored service, so it may accept a request to a URL which does not exists in the service, resulting in a usual 404 error given by the later

Additionally, a complete path can be provided, as in the following example:

```
$ ./cli addService /broker/v1/contextEntities/Room2/attributes/temperature http://
↪localhost:1026/v1/contextEntities/Room2/attributes/temperature 1111 GET
```

In this example, there is a Context Broker running in the port 1026 and a specific query is made available through the Accounting proxy, so only the following request is accepted:

```
GET http://accounting.proxy.com:8000/broker/v1/contextEntities/Room2/attributes/
↪temperature
```

Note: For making the proxy transparent to final users is a good practice to use the same path in the external path and in the URL when providing a complete path. Nevertheless, this is not mandatory, so it is possible to create an alias for a query (i.e */room2/temperature* for the previous example)

- `./cli getService [-p <publicPath>]`: This command is used to retrieve the URL, the application ID and the type (Context Broker or not) of all registered services.

– Options:

* `-p, -publicPath <path>`: only displays the information of the specified service.

- `./cli deleteService <publicPath>`: This command is used to delete the service associated with the public path.
- `./cli addAdmin <userId>`: This command is used to add a new administrator.
- `./cli deleteAdmin <userId>`: This command is used to delete the specified admin.
- `./cli bindAdmin <userId> <publicPath>`: This command is used to add the specified administrator to the service specified by the public path.
- `./cli unbindAdmin <userId> <publicPath>`: This command is used to delete the specified administrator for the specified service by its public path.
- `./cli getAdmins <publicPath>`: This command is used to display all the administrators for the specified service.

To display a brief description of the *cli* tool you can use : `./cli -h` or `./cli -help`. In addition, to get information for a specific command you can use: `./cli help [cmd]`.

Authentication and Authorization

The Accounting Proxy relies on the FIWARE IdM for authenticating users. To do that, the proxy expects that all the requests include a header *Authorization: Bearer access_token* or *X-Auth-Token: access_token* with a valid access token given by the IdM.

Moreover, if the authentication process has succeed, the Accounting Proxy validates the permissions of the user to access to specific service. To do that, it checks if the user has been registered as an admin of the service or if the user has acquired the service.

Is important to notice, that the Business API Ecosystem allows sellers to offer a service in different offerings with different pricing models. In this regard, having just the access token is not enough to determine the accounting unit (pricing model) that has to be used to account the usage of the service. It may happen, that a valid user has acquired the access to a service in two different offerings with two different models (i.e calls and seconds), so the proxy needs extra info to determine the unit to account (in this example calls or seconds). To deal with that problem, the Accounting Proxy generates an API Key which identifies the service, the user, and the accounting unit, so including it in a header *X-API-Key: api_key* when making requests, enables it to know what unit to account.

Note: The X-API-Key header is not intended to provide an extra level of security, but just to remove the possible incertitude around the request

Proxy API

The Accounting Proxy runs by default in the port 9000; nevertheless, this port can be configured as described in *Configuration* section. In this regard, the different services configured though the administration *cli* tool can be accessed directly in the root of the proxy using the public path defined for the service.

In addition, the Accounting Proxy has an administration API which can be accessed though the reserved path */accounting_proxy*. Following, you can find the different services exposed in the administration API:

POST .../newBuy

This service is used by the Business API Ecosystem to notify a new buy. If the accounting proxy has been started over HTTPS, these requests should be signed with the Business API Ecosystem key; otherwise, they will be rejected.

```
{
  "orderId": "...",
  "productId": "...",
  "customer": "...",
  "productSpecification": {
    "url": "...",
    "unit": "...",
    "recordType": "..."
  }
}
```

- *orderId*: order identifier.
- *productId*: product identifier.
- *customer*: customer id.
- *url*: base url of the service.
- *unit*: accounting unit (*megabyte*, *call*, etc).
- *recordType*: type of accounting.

POST .../deleteBuy

This service is used by the Business API Ecosystem to notify a terminated buy. If the accounting proxy has been started over HTTPS, these requests should be signed with the Business API Ecosystem key; otherwise, they will be rejected.

```
{
  "orderId": "...",
  "productId": "...",
  "customer": "...",
  "productSpecification": {
    "url": "..."
  }
}
```

- *orderId*: order identifier.
- *productId*: product identifier.
- *customer*: customer id.
- *url*: base url of the service.

POST .../urls

This service is used by the Business API Ecosystem to check if an URL is a valid registered service. This requests require the “authorization” header with a valid access token from the IdM and the user must be an administrator of the service. If the accounting proxy has been started over HTTPS, these requests should be signed with the Business API Ecosystem key cert; otherwise, they will be rejected.

```
{
  "url": "..."
```

GET .../keys

Retrieve the user’s API_KEYs in a json. This request require the “authorization” header with a valid access token from the IdM.

```
[
  {
    "apiKey": "...",
    "productId": "...",
    "orderId": "...",
    "url": "..."
  },
  {
    "apiKey": "...",
    "productId": "...",
    "orderId": "...",
    "url": "..."
  }
]
```

GET .../units

Retrieve the supported accounting units by the accounting proxy in a JSON. This requests require the “authorization” header with a valid access token from the IdM.

```
{
  "units": ["..."]
}
```

Accounting modules

By default, the Accounting Proxy includes three different modules for accounting. Nevertheless, it is possible to extend the proxy with new modules by creating them in the *acc_modules* directory, those modules have to have the following structure:

```
/** Accounting module for unit: XXXXXX */  
  
var count = function (countInfo, callback) {  
    // Code to do the accounting goes here  
    // .....  
  
    return callback(error, amount);  
}  
  
var getSpecification = function () {  
    return specification;  
}
```

The function *count* receives two parameters: * *countInfo*: object containing both, the request made by the user and the response returned by the service

```
{  
  request: { // Request object used by the proxy to make the request to the service.  
    headers: {  
  
      },  
    body: {  
  
      },  
    ...  
  },  
  response: { // Response object received from the service.  
    headers: {  
  
      },  
    body: {  
  
      },  
    elapsedTime: , // Response time  
    ...  
  }  
}
```

- **callback**: function, which is used to retrieve the accounting value or the error message. The callback expects 2 parameters

- *error*: string with a description of the error if there is one. Otherwise, *null*.
- *amount*: number with the amount to be added to the current accounting.

The function *getSpecification* should return a javascript object with the usage specification for the accounting unit according to the TMF635 usage management API ([TMF635 usage Management API](#)).

Finally, add the name of the developed accounting module to the *config.modules* array in the *config.js* file (the accounting module name is the name of the file, e.g. *megabyte* and *megabyte.js*) and restart the Accounting Proxy.